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PASSENGER PIGEON.
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Natural History

EMBRACING

Living Animals of the World *and* Living Races of Mankind

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Nearly Two Thousand Illustrations

Vol. II.

MAMMALS—BIRDS

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LIVING ANIMALS

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VOLUME II

ANTELOPES—CONTINUED

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ravages amongst all the tragelaphine antelopes that it is to be feared the inyala can now no longer be found anywhere in any considerable numbers. Where I met with these antelopes some years ago, in the country to the south of Delagoa Bay, I found them living either alone or in pairs like bushbucks. They frequented dense thickets in the immediate neighbourhood of a river or lagoon, and I never saw one in anything like open country or far away from water. Their tracks showed me that at night they were accustomed to feed in open spaces in the bush, but they always retired to the jungle again at daylight, as they had become very wary and cunning through constant persecution at the hands of the natives.

Closely allied to the bush-antelopes of the present group are the swamp-haunting SITATUNGAS. Three species of these have been described, — one from East Africa, named after Captain Speke; another from tropical West Africa; and a third from Lake Ngami and the Chobi River, named after the present writer.

There is very little difference between the adult males of these three species, except that in the West African form the coat is of a darker colour than in the other two. The main difference consists in the fact that, whereas the female of Selous' sitatunga is light brown in colour like the male, and the newly born young are very dark blackish brown (the colour of a mole), beautifully striped and spotted with pale yellow, the female and young of the other two forms are red in ground-colour, with white spots and stripes. However, personally I am of opinion that there is only one true species of sitatunga in all Africa, and that the differences between the various forms are superficial, and would be found to grade one into the other, if a sufficiently large series of skins of all ages and both sexes could be gathered together from all parts of the continent. In the Barotse Valley, on the Upper Zambesi, my friend Major R. T. Coryndon informs me that both red and brown female sitatungas are met with. On the Lower Chobi and Lake Ngami region the females are never red, but always of the same brown colour as the males, whilst on the Congo all the females are red.

Photo by Mr. W. Rau [*Philadelphia*

A PAIR OF YOUNG PRONGBUCKS

From the fact that the horns of the males are annually shed, the prongbuck is assigned to a group apart from the Antelopes

The male sitatunga stands about 3 feet 6 inches at the shoulder, and varies in general colour in different localities from light to dark brown. The adult females are either red with a few faint stripes and spots, or light brown, only retaining very faint traces of any stripes or spots. The young are, both in tropical West and Central East Africa, red, striped, and spotted with white; but in South-west Africa dark blackish brown, with spots and stripes of yellowish white. The hoofs are excessively long, and the skin which covers the back of the pastern is hairless, and of a very thick and horny consistency. The males alone carry horns, which are of the same character as in the inyala, but more spiral and longer, having been known to attain a length of 28 inches in a straight line and 35 inches over the curve.

The sitatunga is an inhabitant of the extensive swamps which exist in many parts of the interior of Africa. It may be said to live in the water, as it passes its life in flooded beds of reeds and papyrus, into the muddy bottoms of which its long hoofs, when splayed out, prevent

Photo by the Duchess of Bedford]

FEMALE GORAL

The goral is a Himalayan antelope, with somewhat the habits of a chamois

it from sinking. When forced out into dry ground by heavy floods, the formation of its feet so hinders it in running that it can be overtaken and speared by a native on foot. I was informed by the natives on the Chobi River that, when the floods enabled them to paddle their canoes through the reed-beds, they often killed considerable numbers of the sitatungas. These animals, they said, when they saw a canoe approaching, would often not attempt to seek safety by flight, but would sink down in the water, submerging their whole bodies, and leaving only their nostrils above the surface, and in this position were easily speared.

The sitatunga is not gregarious, but is met with singly or in pairs. The hair is long, but soft and silky; and the skins are much sought after by the natives for blankets.

In addition to the bushbucks and sitatungas, two more very notable spiral-horned African antelopes remain to be mentioned — namely, the GREATER KUDU and the LESSER KUDU.

The GREATER KUDU is one of the most magnificent-looking of the whole family of antelopes, and is an animal of large size, an adult male standing 4 feet 9 inches and upwards at the withers. The general colour of this species is light brown to dark grey, the old males looking much darker than females or younger animals, because the scantiness of their coats shows the dark colour of the skin beneath. On each side of the body and hind-quarters there are several white stripes, which vary in number from four to eight or nine. As in all this group of antelopes,

Photo by W. P. Dando] [Regent's Park

HARNESSED ANTELOPE

A very beautiful species, in which the ground-colour of the coat is a rich chestnut, while the spots and stripes are pure white

Photo by the Duchess of Bedford, Woburn Abbey.

FEMALE KUDU.

The Kudu is one of the handsomest of the African Antelopes, the corkscrew-like horns of the bucks forming some of the most striking of all sporting trophies.

there are two or three cheek-spots, as well as an arrow-shaped white mark across the nose, below the eyes. In the male there is a slight mane on the back of the neck, and a fringe of long white and blackish-brown hair intermixed, extending from the throat to the chest. The ears are very large and rounded, and the male is adorned with magnificent spiral horns, which have been known to attain a length of 48 inches in a straight line from base to tip, and 64 inches over the curve.

The greater kudu once had a very wide range, which extended from the central portions of the Cape Colony to Angola on the west, and on the east throughout East Africa up to Abyssinia; but, with the single exception of the buffalo, no species of wild animal suffered more from the terrible scourge of rinderpest which recently swept over the continent than this lordly antelope, and it has almost ceased to exist in many districts of South and South Central Africa, where up to 1896 it was still very numerous.

The greater kudu is a bush-loving antelope, and very partial to wooded hills, though it is also plentiful in the neighbourhood of rivers which flow through level tracts of country covered with forest and bush. In my own experience it is never found at any great distance from water. It eats leaves and wild fruits as well as grass, and lives in small herds or families, never, I believe, congregating in large numbers. In Southern Africa, at any rate, it was always exceptional to see more than twenty greater kudus together, and I have never seen more than thirty. At certain seasons of the year the males leave the females, and live alone or several together. I once saw nine magnificently horned kudus standing on the bank of the Chobi, and I have often seen four or five males of this species consorting together. As a rule the greater kudu is met with in hilly country or in bush so dense that a horse cannot gallop through it at full speed; but if met with in open ground, a good horse can overtake an old male without much difficulty. The females are much lighter and faster and cannot be overtaken in any kind of ground.

The greater kudu is one of the most timid and inoffensive of animals, and when attacked by dogs will not make the slightest attempt to defend itself either with its horns or by kicking.

The LESSER KUDU in general colour nearly resembles its larger relative, but is much smaller, the males only standing about 40 inches at the withers, and it lacks the long fringe of hair under the throat. The white stripes on the body and hindquarters are, however, more numerous — from eleven to fourteen; and the horns, which are only present in the males, are less divergent, and with the spiral curvature much closer than in the greater kudu.

The lesser kudu is an inhabitant of Somaliland and the maritime

Photo by Percy Ashenden [*Cape Town*

MALE KUDU

A kudu bull stands about 5 feet or a little more at the withers, being in size only inferior to the eland. The horns form a corkscrew-like spiral

districts of British East Africa. It frequents thick scrubby jungle, and is said to be exceedingly watchful and wary. It lives either in pairs or in small families, but never congregates in large herds. Like all the tragelaphine antelopes, this species is a leaf-eater, and feeds principally during the night, lying up in thick bush during the heat of the day.

There remains to be mentioned but one other group of antelopes, the ELANDS, large, heavily built animals, which belong to the present group, but differ from all species of kudu, sitatunga, and bushbuck, inasmuch as both sexes are horned. There are two forms of the COMMON ELAND—namely, the grey variety of South-western Africa, and the striped animal, which is found in the countries farther north and east. The two forms grade one into the other, and are absolutely identical in their habits and mode of life, the differences between them being merely superficial. To the south of the twenty-third parallel of south latitude all elands are of a uniform fawn colour, except the old animals, which look dark grey, from the fact that the scantiness of their coats allows the dark colour of the skin to show through the hair. Old males, when standing in the shade of a tree, appear to be of a deep blue-grey in colour, and are known to the colonists of South Africa as "blue bulls." In Rhodesia, South-east Africa, and the countries to the north of the Zambesi, all the elands are bright chestnut-red when young, with a black line down the centre of the back from the withers to the tail, broad black patches on the backs of the fore legs above the knees, and eight or nine white stripes on each side. When they grow old, the ruddiness of the ground-colour gradually fades, the black markings on the fore legs die out, and the white stripes become indistinguishable at a short distance, the old bulls looking deep blue-grey in general colour. Every intermediate stage of colouring between the unstriped and the highly coloured forms of eland is to be found in the district lying between the central portions of the Kalahari Desert and the Zambesi River. Old male elands south of the Zambesi develop a growth of long, bristly black hair on the forehead, which often hangs over their eyes and extends half-way down their noses. North of the Zambesi this growth of hair is not nearly so luxuriant.

Photo by J. W. McLellan [*Highburg*

ELAND

A feature of the eland is the large "dewlap." Unlike the kudu, both sexes are horned

I have carefully measured the standing height at the withers of many old male elands in the interior of South Africa, and found that it varied from 5 feet 8 inches to 5 feet 10 inches. The horns of bulls in their prime measure from 26 inches to 33 inches in length, but old bulls wear their horns down very much. The cows carry longer, though thinner horns than the bulls.

The range of the eland once extended from Cape Agulhas to the White Nile, but it has become extinct in many districts of Southern Africa, and in almost every other portion of its range has, like all other tragelaphine antelopes, suffered so cruelly from the recent visitation of rinderpest that it has now become a scarce animal all over Africa.

During the rainy season elands are usually met with in small herds of from four or five

Photo by the Duchess of Bedford] [*Woburn Abbey*

ELAND COWS

Female elands carry longer, although more slender horns than the bulls

to ten individuals; but towards the end of the dry season they collect into large herds, and at such times I have often seen from fifty to over two hundred of these animals in one troop.

In my experience elands live for two-thirds of the year in forest or bush-covered country, or amongst rugged hills; and in such localities they are difficult to overtake on horseback; but in the middle of the dry season, as soon as they smell the smoke of the grass fires lighted by the natives on the open plateaux, they leave their retreats, and, collecting in herds, wander out on to the treeless plains in search of young grass. They then fall an easy prey to a mounted hunter, especially the heavy old bulls, which can be run to a standstill with ease by a very moderate horse.

The flesh of the eland is excellent when the animal is in good condition, as at such a time these animals become very fat, especially the old bulls, whose hearts become encased in a mass of fat which will often weigh 20 lbs. It is a mistake, however, to think that eland-meat is always good; for towards the end of the dry season, when there is little grass to be got, they feed extensively on the leaves of certain bushes, and their meat at such times becomes very poor and tasteless.

Besides the common eland of Southern, Central, and Eastern Africa, another distinct species is met with in Senegal and the Gambia Colony. This is the DERBIAN ELAND, about which animal our knowledge is still very slight, as I believe that it has never yet been shot nor its habits studied by a European traveler. A good many skulls and horns and a few skins have been obtained from natives, from which it appears that in general colour this species is of a rich reddish-fawn colour, becoming nearly white below, the middle of the belly being black. The neck is covered with long hair of a dark brown or black colour, blacker towards the shoulder than in front. A broad black stripe extends all down the centre of the back from the neck to the root of the tail, and there are large black patches on the backs and inner sides of the fore legs above the knees. On each side of the body and haunches there are thirteen or fourteen narrow white stripes. The horns are larger and more massive and divergent than in the common eland.

Photo by W. P. Dando

BULL ELAND

The flesh of the eland is of better flavour than that of most other large game. If sheltered in winter, the species will thrive in English parks

The Derbian eland is said to be a forest-loving animal, never of its own accord coming out into the plains. It lives in small herds, is very shy and not at all abundant, and browses on the leaves and young shoots of various trees and bushes.

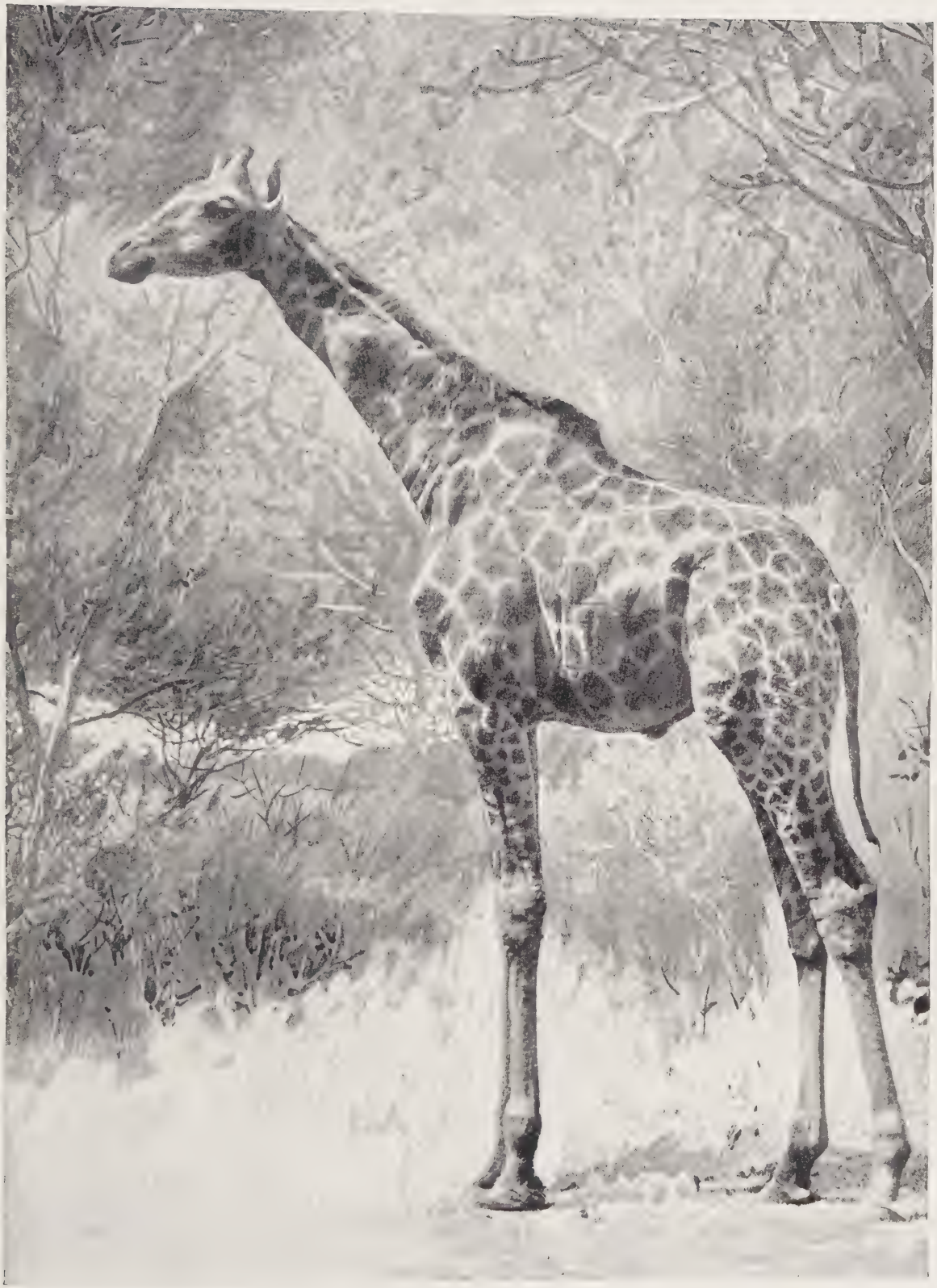


Photo by W. P. Dando]

THE SOUTHERN GIRAFFE

The tallest mammal ever known to walk the earth

CHAPTER XVI

THE GIRAFFE AND OKAPI

THE GIRAFFE

BY H. A. BRYDEN

Photo by Miss E. J. Beck

SOUTHERN GIRAFFE LYING DOWN

This giraffe was a present to Queen Victoria; it only lived fourteen days after its arrival

GIRAFFES, which are found only in the continent of Africa, are the tallest of all living creatures. They belong to the Ruminants, or Cud-chewers, and naturalists are inclined to place them somewhere between the Deer Family and the Hollow-horned Ruminants, in which latter are to be found oxen, buffaloes, and antelopes. Rütimeyer, the Swiss naturalist, once defined them as "a most fantastic form of deer," which is, perhaps, as good a definition of them as one is likely to hit upon. Fossil discoveries show that, in ages long remote, great giraffe-like creatures, some of them bearing horns or antlers, roamed widely in the south of Europe, Persia, India and even China.

Of living giraffes, two species have thus far been identified, — the SOUTHERN or CAPE GIRAFFE, with a range extending from Bechuanaland and the Transvaal to British East Africa and the Soudan; and the NUBIAN or NORTHERN GIRAFFE, found chiefly in East Africa, Somaliland, and the country between Abyssinia and the Nile. The southern giraffe, which, from its recent appearance in the Gardens of the Zoological Society, is now the more familiar of the two animals, has a creamy or yellowish-white ground-colour, marked by irregular blotches, which vary in colour, in animals of different ages, from lemon-fawn to orange-tawny, and in older specimens to a very dark chestnut. Old bulls and occasionally old cows grow extremely dark with age, and at a distance appear almost black upon the back and shoulders. The northern giraffe is widely different, the coloration being usually a rich red-chestnut, darker with age, separated by a fine network of white lines, symmetrically arranged in polygonal patterns. At no great distance this giraffe, instead of having the blotchy or dappled appearance of the southern giraffe, looks almost entirely chestnut in colour. Again, the southern giraffe has only two horns, while the northern species usually develops a third, growing from the centre of the forehead. These horns, which are covered with hair in both species, and tufted black at the tips, are, in the youthful days of the animal, actually separable from the bones of the head. As the animal arrives at maturity, they become firmly

united to the skull. A third race or sub-species of giraffe has been identified in Western Africa mainly from the skull and cannon-bones of a specimen shot in 1897 at the junction of the Binue and Niger Rivers; but very little is known abont this form. Other varieties or sub-species may yet be discovered in other parts of the Dark Continent. It is lacking in the giraffe's long neck.

The towering height of the giraffe is entirely attributable to the great length of the neck and limbs. A full-grown bull giraffe will certainly measure occasionally as much as 19 feet in height. I measured very carefully a specimen shot by my hunting friend, Mr. W. Dove, in the forests of the North Kalahari, South Africa, which taped 18 feet 11½ inches. A fine cow, shot by myself in the same country, measured 16 feet 10 inches, and there is no reason to suppose that cow giraffes do not easily reach fully 17 feet in height. These animals feed almost entirely upon the leaves of acacia-trees, the foliage of the *kameel-doorn*, or giraffe-acacia, affording their most favourite food-supply. It is a most beautiful spectacle to see, as I have seen, a large troop of these dappled giants — creatures which, somehow, viewed in the wild state, always seem to me to belong to another epoch — quietly browsing, with upstretched necks and delicate heads, among the branches of the spreading *mokala*, as the Bechuanas call this tree.

The giraffe's upper lip is long and prehensile, and covered, no doubt as a protection against thorns, with a thick velvety coating of short hair. The tongue is long — some 18 inches in length — and is employed for plucking down the tender leafage on which the giraffe feeds. The eyes of the giraffe are most beautiful — dark brown, shaded by long lashes, and peculiarly tender and melting in expression. Singularly enough, the animal is absolutely mute, and never, even in its death-agonies, utters a sound. The hoofs are large, elongate, nearly 12 inches in length in the case of old bulls, and look like those of gigantic cattle. There are no false hoofs, and the fetlock is round and smooth. The skin of a full-grown giraffe is extraordinarily tough and solid, attaining in the case of old males as much as an inch in thickness. From these animals most of the *sjamboks*, or colonial whips, in use all over South Africa, are now made; and it is a miserable fact to record that giraffes are now slaughtered by native and Boer hunters almost solely for the value of the hide, which is worth from £3 to £5 in the case of full-grown beasts. So perishes the giraffe from South Africa.

Giraffes live mainly in forest country, or country partially open and partially clothed with thin, park-like stretches of low acacia-trees. When pursued, they betake themselves to the densest part of the bush and timber, and, their thick hides being absolutely impervious to the frightful thorns with which all African jungle and forest seem to be provided, burst through every bushy obstacle with the greatest ease. They steer also in the most wonderful manner through the timber, ducking branches and evading tree-boles with marvellous facility. I shall never forget seeing my hunting comrade after his first chase in thick bush. We had ridden, as we always rode hunting, in our flannel shirts, coatless Attracted by his firing, I came up with my friend, who was sitting on the body of a huge old bull giraffe, which had fallen dead in a grassy clearing. He was looking ruefully at the remains of his shirt, which hung about him, literally in rags and ribbons. Blood was streaming from innumerable wounds upon

Photo by W. P. Dando] *[Regent's Park*

MALE SOUTHERN GIRAFFE

The coloration of these animals harmonises exactly with the dark and light splashes of their surroundings

Photo by A. S. Rudland & Sons

A GIRAFFE GRAZING

Grazing is evidently not the natural mode of feeding of these animals, which are essentially browsers

his chest, neck, and arms. Always after that we donned cord coats, when running giraffes in bush and forest country.

In regions where they have been little disturbed, giraffes no doubt wander across open plains, and are to be seen well away from the denser forests, feeding among scattered islets of acacias, easily exposed to the human eye. But in South Africa they are now seldom to be met with out of the forest region. Once, and once only, have I seen giraffes in the open. This was on the outskirts of the forest, and the great creatures had been tempted to a little knoll of *mokala* trees, rising like an islet from the sea of grass.

One's first impression of these creatures in the wild state is very deceptive. I well remember first setting eyes upon a troop of five or six. As they swung away from the leafage on which they were feeding, my friend and I cantered easily, thinking that we should soon come up with them. We were completely deceived. With those immense legs of theirs, the great creatures, going with their easy, shuffling, but marvellously swift walk, were simply striding away from us. Discovering our mistake, we rode hard, and the giraffes then broke into their strange, rocking gallop, and a headlong, desperate chase began, to be terminated by the death of a fine cow. Like the camel, the giraffe progresses by moving the two legs upon either side of the body simultaneously. At this strange, rocking gallop these animals move at a great pace, and a good Cape horse is needed to run into them. By far the best plan, if you are bent on shooting these animals, is to press your pony, so soon as you sight giraffes, to the top of its speed, and force the game beyond its natural paces in one desperate gallop of a couple of miles or so. If well mounted, your nag will take you right up to the heels of the tall beasts, and, firing from the saddle, you can, without great difficulty, bring down the game. The giraffe, unlike the antelopes of Africa, is not very tenacious of life, and a bullet planted near the root of the tail will, penetrating the short body, pierce a vital spot, and bring down the tall beast crashing to earth. Having tasted the delights of fox-hunting and many other forms of sport, I can testify that the run up to a good troop of giraffes is one of the most thrilling and exciting of all human experiences. There is nothing else quite like it in the wide range of sporting emotions. Having enjoyed this thrilling pleasure a few times, however, the humane hunter will stay his hand, and shoot only when meat, or perhaps an exceptionally fine specimen, is absolutely needed. Giraffes are, of course, utterly defenceless, and, save for their shy, wary habits and remote, waterless habitat, have nothing to shield them from the mounted hunter.

Giraffe-hunting on foot is a very different matter. In that case the giraffe has the better of it, and the stalker is placed at great disadvantage. These animals are in many places found in extremely waterless country, where even the mounted hunter has much trouble to reach them. Like elands and gemsbok and other desert-loving antelopes, they can exist for long periods — months together — without drinking. In the northern portions of the Kalahari Desert, where I have carefully observed their habits, as well as hunted them, it is an undoubted

fact that giraffes never touch water during the whole of the dry winter season — for several months on end. Gemsbok and elands in the same waterless tract of country are complete abstainers for the same period. The flesh of a giraffe cow, if fairly young, is excellent, tender, and well tasted, with a flavour of game-like veal. The marrow-bones also, roasted over a gentle wood fire, and sawn in half, afford delicious eating, quite one of the supreme delicacies of the African wilderness.

THE OKAPI

BY SIR HARRY JOHNSTON, K.C.B., F.Z.S.

READERS of "The Living Animals of the World" are in all probability readers of newspapers, and it would therefore be affectation on the part of the writer of these lines to assume that they have not heard more or less of the discovery which he was privileged to make of an entirely new ruminant of large size, dwelling in the forests bordering the Semliki River, in Central Africa, on the borderland between the Uganda Protectorate and the Congo Free State. The history of this discovery, stated briefly, is as follows: — In 1882–83 I was the guest of Mr. (now Sir Henry) Stanley on the River Congo at Stanley Pool. I was visiting the Congo at that time as an explorer in a very small way and a naturalist. Mr. Stanley, conversing with me on the possibility of African discoveries, told me then that he believed that all that was most wonderful in tropical Africa would be found to be concentrated in the region of the Blue Mountains, south of the Albert Nyanza. This feeling on Stanley's part doubtless was one of the reasons which urged him to go to the relief of Emin Pasha. His journey through the great Congo Forest towards the Blue Mountains of the Albert Nyanza resulted in his discovery of the greatest snow mountain-range of Africa, Ruwenzori, and the river Semliki, which is the Upper Albertine Nile; of Lake Albert Edward, from which it flows round the flanks of Ruwenzori; and, amongst other things, in more detailed information regarding the dwarf races of the Northern Congo forests than we had yet received. Stanley also was the first to draw the attention of the world to the dense and awful character of these mighty woods, and to hint at the mysteries and wonders in natural history which they possibly contained. The stress and trouble of his expedition prevented him and his companions from bestowing much attention on natural history; moreover, in these forests it is extremely difficult for persons who are passing hurriedly through the tangle to come into actual contact with the beasts that inhabit them. Sir Henry Stanley, discussing this subject with me since my return from Uganda, tells me that he believes that the okapi is only one amongst several strange new beasts which will be eventually discovered in these remarkable forests. He describes having seen a creature like a gigantic pig 6 feet in length, and certain antelopes unlike any known type. In regard to the okapi, the only hint of its existence which he obtained was the announcement that the dwarfs knew of the existence of a creature in their forests which greatly resembled an ass in appearance, and which they caught in pits. This tiny sentence in an appendix to his book "In Darkest Africa" attracted my attention some time before I went to Uganda. It seemed to me so extraordinary that any creature like a horse should inhabit a dense

Photo by Charles Knight]

A GIRAFFE BROWSING

Here the posture is seen to be thoroughly natural

forest, that I determined, if ever fate should lead me in that direction, I would make enquiries.

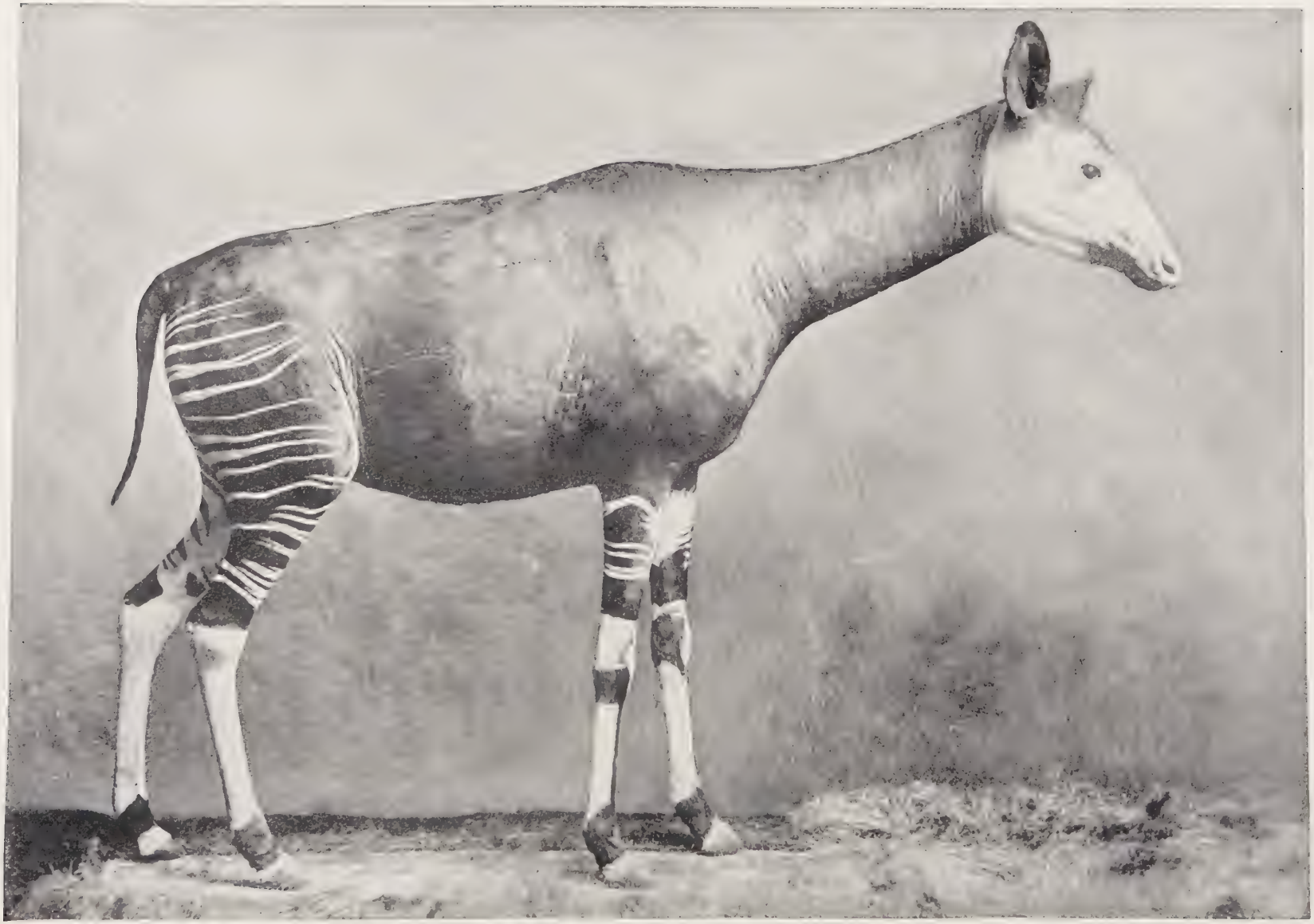
Soon after reaching the Uganda Protectorate at the end of 1899, I came in contact with a large party of dwarfs who had been kidnapped by a too enterprising German impresario, who had decided to show them at the Paris Exhibition. As the Belgians objected to this procedure, I released the dwarfs from their kidnapper, and retained them with me for some months in Uganda, until I was able personally to escort them back to their homes in the Congo Forest. I had other reasons connected with my Government business for visiting the north-western part of the Congo Free State. As soon as I could make the dwarfs understand me by means of an interpreter, I questioned them regarding the existence of this horse-like creature in their forests. They at once understood what I meant; and pointing to a zebra-skin and a live mule, they informed me that the creature in question, which was called OKAPI, was like a mule with zebra stripes on it. When I reached Fort Mbeni, in the Congo Free State, on the west bank of the river Semliki, I put questions to the Belgian officers stationed there. They all knew the okapi, at any rate, when dead. As a living animal they had none of them seen it, but their native soldiers were in the habit of hunting the animal in the forest and killing it with spears, and then bringing in the skin and the flesh for use in the fort. One of the officers declared there was even then a freshly obtained skin lying about in the precincts of the fort. On searching for this, however, it was discovered that the greater part of it had been thrown away, only the gaudier portions having been cut into strips by the soldiers to be made into bandoliers. These strips, together with similar ones obtained from natives in the forest, I sent to England, to Dr. P. L. Sclater, for his consideration. Furnished by the Belgian officers with guides, and taking with me all the dwarfs whom I had brought from Uganda, I entered the forest, and remained there for some days searching for the okapi. All this time I was convinced that I was on the track of a species of horse; and therefore when the natives showed the tracks of a cloven-footed animal like the eland, and told us these were the foot-prints of the okapi, I disbelieved them, and imagined that we were merely following a forest eland. We never saw the okapi; and as the life in the forest made the whole expedition extremely ill, and my time was required for official work elsewhere, I was obliged to give up this search. Meantime, I had elicited from the natives, whom I questioned closely, that the okapi was a creature without horns or any means of offence, the size of a large antelope or mule, which inhabited only the densest parts of the forest, and generally went about in pairs, male and female. It lived chiefly on leaves. The Belgian officers, seeing that I was disappointed at not obtaining a complete skin, offered to use their best efforts to obtain one for me, and send it on to Uganda after my departure.

Photo by York & Son [*Notting Hill*

MALE AND FEMALE GIRAFFES

Giraffes are said to be very affectionate animals

This promise was eventually redeemed by Mr. Karl Eriksson, a Swedish officer in the Belgian service. Mr. Eriksson sent me a complete skin and two skulls. The skin and the



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THE OKAPI OF THE CONGO FOREST

Previous to the discovery of this ruminant the giraffe stood alone among the mammals of the world. It has now at least one living relative

bigger of the two skulls belonged to a young male. This is the skin which is now set up in the Natural History Museum at South Kensington, and of which a photographic illustration accompanies this notice. Upon receiving this skin, I saw at once what the okapi was — namely, a close relation of the giraffe. From the very small development of the horn-bosses, I believed that it was nearer allied to the helladotherium than to the living giraffe. In forwarding the specimens to Professor Ray Lankester, I therefore proposed that it should be called *Helladotherium tigrinum*. Professor Ray Lankester, having examined the specimens with a greater knowledge than I possessed, decided that the animal was rather more closely allied to the giraffe than to the helladotherium, but that it possessed sufficient peculiarities of its own to oblige him to create for its reception a new genus, which he proposed to call *Ocapia*.

Meantime, the original strips of the skin (which apparently belonged to an older and larger animal than the specimen mounted at South Kensington) had been pronounced by experts to whom they were submitted to be the skin of an undiscovered species of horse, and this supposed new horse had been tentatively named by Dr. P. L. Sclater *Equus johnstoni*. The full discovery obliged Professor Ray Lankester to set aside any idea of the okapi being allied to the horse, but he was good enough to attach Mr. Sclater's specific name of *johnstoni* to his newly founded genus of *Ocapia*.

Copyright photograph by Hutchinson & Co.

HEAD OF OKAPI

The enormous size of the ears is very noteworthy

Up to the time of writing this is all that is known of this extraordinary survival in the Congo Forest of the only living relation of the giraffe. We know by palæontological discoveries in Europe and in Asia that there existed a large family of ruminants which in their development and features were neither of the Ox group nor of the Deer, but in some respects occupied a position midway between these two branches of cloven-hoofed, horned, ruminating Ungulates. To this family the Giraffe, the Okapi, the Helladotherium, the Samotherium, the Sivatherium, and the Bramatherium belong. In all probability bony projections arose from the skulls of these creatures similar in some measure to the prominent bony cores of the horns of oxen. From the top, however, of these bony cores there would seem to have arisen anciently antlers, possibly deciduous like those of the prongbuck. In time creatures like the giraffe lost any need for such weapons of offence, and ceased to grow antlers; but the bony cores from which these antlers once proceeded still remained, and in the case of the giraffe remain to the present day. In the helladotherium and in the okapi these bony cores have dwindled to mere bumps.

CHAPTER XVII

THE DEER TRIBE

BY H. A. BRYDEN

DEER represent as a family the non-domesticated class of ruminants. Generally speaking, the males are distinguished by antlers, which are shed periodically, usually once a year, and again renewed. Comprising as it does some of the noblest mammals to be found on the face of the earth, this large and important tribe is to be found distributed over a large portion of the world's surface, from the Arctic North, the home of the wild reindeer, to Patagonia, in Southern South America. Deer are, however, not found in the continent of Africa south of the Sahara, nor in Madagascar or Australia. They are not indigenous to New Zealand; but the red deer, introduced there some years ago for purposes of sport, have thriven wonderfully well, and are now completely acclimatised.

From the earliest times deer, especially those species known as the true or typical deer, of which red deer may be said to be a type, have been animals of considerable importance to mankind. Their flesh has been always eagerly sought after; deer-skin is still, even in these days of high civilisation, useful for many purposes; and the antlers are almost equally in request.

It is more than probable that, in the vast and still little-explored regions of Central, East, and Northern Asia, new species of deer remain to be discovered. At the present time there are known to exist, in various parts of the world, close on a hundred species and varieties. Within the space allotted to these animals it is, of course, manifestly impossible to notice all these in anything like detail. Many of the varieties or sub-species closely resemble one another, so much so that the differences between them are only apparent to the eyes of naturalists or acute observers.

Photo by Valentine & Sons, Ltd. [*Dundee*

SCANDINAVIAN REINDEER

The spreading hoofs enable the reindeer to traverse snow and swamps without sinking

THE REINDEER

REINDEER are distinguished from all other kinds of deer by the fact that antlers are borne by both males and females. The

antlers, as may be seen by the illustration, differ materially from those of the red deer, elk, and other species; the brow-tines, especially, are often much palmated. These animals are heavily built, short-legged, and, as beseems dwellers in a snowy habitat, provided with round, short, and spreading hoofs. For ages reindeer have been domesticated by the Lapps of Scandinavia, the Samoyeds, and other primitive races of Northern Europe and Asia. Trained to harness, and drawing a sledge, they traverse long distances, while their milk, flesh, and hides are of great importance to the people who keep them. The COMMON or SCANDINAVIAN REINDEER ranges from Norway through Northern Europe into Asia, though how far eastward is not yet accurately determined. It is interesting to note that these animals were once denizens of Britain, and so lately as the twelfth century the Jarls of Orkney are believed to have been in the habit of crossing to the mainland for the purpose of hunting them in the wilds of Caithness. Wild reindeer are still to be found in the remoter parts of Norway, though, from much persecution, they are becoming comparatively scarce in most parts of the country.

By permission of the New York Zoological Society

WOODLAND CARIBOU

This specimen has shed its horns, which are of the general type of those of the Scandinavian race

Mr. Abel Chapman, in his "Wild Norway," gives some excellent accounts of sport with these fine deer. Speaking of a good herd of twenty-one, discovered in Ryfylke, he says: "Most of the deer were lying down, but both the big stags stood upright in dreamy, inert postures. . . . I now fully realised what a truly magnificent animal I had before me. Both in body and horn he was a giant, and his coat was no less remarkable; the neck was pure white, and beneath it a shaggy mane hung down a foot in length. This white neck was set off by the dark head in front and the rich glossy brown of his robe behind. Besides this the contrasting black and white bars on flanks and stern were conspicuously clean-cut and defined, and the long and massive antlers showed a splendid recurved sweep, surmounted by branch-like tines, all clean." For three long, agonising hours the stalker watched this noble prize, and then one of those lucky chances which occasionally gladden the hunter's heart occurred, and the reindeer approached within a hundred yards. "Half-a-dozen forward steps, and his white neck and dark shoulder were beautifully exposed. Already, ere his head had appeared, the rifle had been shifted over, and now the foresight dwelt lovingly on a thrice-refined aim. The 450 bullet struck to an inch, just where the shaggy mane joined the brown shoulder. The beast winced all over, but neither moved nor fell. A moment's survey, and I knew by the swaying of his

New York Zoological Park]

[*Copyright 1901, N. Y. Zoological Society*

MULE DEER, WITH ANTLERS IN THE VELVET

head that he was mine." The weight of this big reindeer stag was estimated at 450 lbs., or 32 stone. He carried twenty-five points to his antlers, which measured 51 inches in extreme length.

In addition to the common or Scandinavian reindeer, there are closely allied races, showing, however, slightly varying characteristics, found in Spitzbergen and Greenland. In North America, where only wild reindeer are found, these animals are known as CARIBOU. Here several sub-species are known: among them, the NEWFOUNDLAND CARIBOU; the WOODLAND CARIBOU of the mainland; and the BARREN-GROUND CARIBOU, found in the arctic wastes of the Far North-west, towards the Polar Ocean.

THE ELK, OR MOOSE

This gigantic creature, the largest of all the numerous tribe of deer, is found, in the Old World, in Northern Europe, Siberia, and Northern China. Its range extends — for there is no real distinction between the elk of the Old and the New Worlds — to Northern America, where it is always known as the MOOSE, — its American habitat extending from the mouth of the Mackenzie River to the St. Lawrence. Wherever its abiding-place may be, it will be found that the elk is essentially a forest-loving creature, partial to the loneliest stretches of the woods and dreary marshes. Its fleshy, bulbous, prehensile muzzle shows plainly that the elk is a browsing beast, and not a grazing animal, like most other deer. The male carries vast palmated horns, measuring sometimes as much as 6 feet $1\frac{1}{4}$ inch in span from tip to tip; this measurement is from an American specimen in the possession of the Duke of Westminster. A fine Scandinavian bull will measure 18 hands at the withers and weigh as much as 90 stone, while the North American elk is said to attain as much as 1,400 lbs. In colour the elk is a dark brownish grey; the neck, body, and tail are short; while the animal stands very high

By permission of the New York Zoological Society

FEMALE AMERICAN ELK, OR MOOSE

The elk of the two hemispheres are so alike that they cannot be regarded as anything more than races of a single species

upon the legs. Under the throat of the male hangs a singular appendage, a sort of tassel of hair and skin, known to American hunters as the "bell." The build of the elk is clumsy, and the mighty beast entirely lacks the grace characteristic of so many others of the deer kind. It has in truth a strangely primeval, old-world aspect, and seems rather to belong to prehistoric ages than to modern times.

In Scandinavia elk are hunted usually in two ways—by driving, or with a trained dog held in leash. In the royal forests of Sweden great bags are made at these drives; and in the year 1885, when a great hunt was got up for the present King of England, forty-nine elk were slain. Except during the rutting-season these titanic deer are extremely shy and suspicious creatures, and the greatest precautions have to be taken in hunting them.

Photo by C. Reid [*Wishaw, N.B.*

PARK RED DEER

The typical representative of the entire Deer Tribe

In Canada moose are often shot during the rutting-season by "calling," a rude horn of birch-bark being used, with which the hunter simulates the weird, hoarse roar of the animals, as they call to one another, or challenge in the primeval woodlands and morasses of the wild North. Still-hunting or tracking — spooring, as it would be called in South Africa — is another and extremely fatiguing method; while yet another mode of hunting is that practised by Indian and half-breed hunters in winter, when, the sportsman being mounted on snow-shoes, the moose is followed, run into and shot in deep snow. In this sport the hunter has much the better of it. The moose, with its vast weight and sharp hoofs, plunges through the frozen snow-crust, over which the snow-shoes carry the biped easily enough, and, becoming presently exhausted, is shot without much difficulty. Elk usually run at a steady, slinging trot, and traverse extraordinary distances, apparently with little fatigue.

Red Deer

We come now to a group of what are called typical deer, the Red Deer, found in various parts of the world. The red deer, which once roamed over much of Britain, is now in the wild state confined chiefly to the Highlands of Scotland, Exmoor, part of County Kerry in Ireland, and various islands on the west coast of Scotland. A good male specimen will stand about 4 feet or a little less at the shoulder, carry antlers bearing twelve or fourteen points, and weigh from 16 to 20 stone clean — that is, with the heart, liver, and lungs taken out. The woodland stags of Perthshire, however, not infrequently reach 25 stone, while Mr. J. G. Millais mentions a stag, killed by Colonel the Hon. Alastair Fraser at Beaufort, Inverness-shire, which scaled 30 stone 2 lbs. clean. This seems to be the heaviest British wild stag of modern times. The summer coat is short, shining, and reddish brown in hue; in winter the pelage is

thicker and rougher and greyish brown in colour. Stalking the red deer stag in its native fastnesses is beyond all doubt the finest wild sport now left to inhabitants of the British Isles.

Mr. J. G. Millais, author of "British Deer and their Horns" and other works, himself a first-rate sportsman in many parts of the world, compares the style of shooting red deer in vogue forty or fifty years ago with that obtaining in the Highlands at the present day. "A stalker in Black Mount, Argyllshire," he says, "told me of a typical day's sport in which he took part some forty years ago. Fox Maule and Sir Edwin Landseer were the two rifles (they frequently stalked in pairs at that time), and, on the side of Clashven, Peter Robertson, the head forester, brought them within eighty yards of two exceptionally fine stags Maule fired and missed, as did also Sir Edwin as the stags moved away; then, on a signal from Robertson, Peter McColl, the gillie, slipped the hounds — the two best ever owned by the late Marquis of Breadalbane, and whose portraits are still preserved in the famous picture of 'The Deer Drive' — and away they went in hot pursuit of the deer. An end-on chase now ensued, the line taken being due east down the great glen towards Loch Dochart, and at last the stalkers were brought to a standstill, being fairly exhausted both in wind and limb. At this moment, however, four dark spots, like small rocks, standing out at the point of a little promontory in the lake, attracted their attention, and, on drawing nearer, they saw, to their surprise, each of the big stags being held at bay by a gallant hound. A couple of shots then settled the business, and so ended what was then considered a grand day's sport. No doubt it was most exciting to see the struggle of bone and sinew between two such noble quadrupeds, but it was not rifle-shooting. To-day the gallant but disturbing deer-hound has given place to the cunning and obedient collie, and the success of the stalker depends, for the most part, on the accuracy of his rifle and his skill in using it."

Photo by W. P. Dando]

AN ASIATIC WAPITI

All the races of the wapiti are easily recognisable by the large fourth tine of the antlers and the short tail

Here are a couple of sketches of modern stalking taken from Mr. Millais' own diary: —

"*Wednesday, October 4th.* — Started for the big corrie with McColl, and saw nothing till we got to the Eagle Hill. On this were three stags and about twenty hinds, the property of a magnificent fellow carrying one of the best heads I have ever seen on Black Mount. For some time McColl thought he was just a bit too good to shoot, for the very best in this forest are generally left for stock purposes. Finding, however, that he was not Royal [a twelve-pointer], my companion agreed to a shot — that is, if he got within shooting distance, which was not too likely, the Eagle Hill being one of those queer places where back eddies are carried down from almost every 'airt' from which the wind is blowing. Luck is apparently entirely my way this week, so far at any rate. The big stag was very 'kittle,' frequently roaring and keeping his hinds moving before him along the hillside, in the direction of another corrie running at right angles, the entrance to which, if reached, would checkmate us. A quick, stiff climb, and a dashing piece of stalking on the part of McColl, brought us in front of the herd only just in time, for I had hardly got

Photo by the Duchess of Bedford]

AMERICAN WAPITI

The giant deer of the Rocky Mountains, formerly very plentiful, now scarce

Photo by Mr. W. Rau] [*Philadelphia*

AMERICAN WAPITI

The dark head, fore-quarters, and under-parts, so distinctive of the wapiti, are here well displayed

into position when the first few hinds moved past a hundred yards below us. They were very uneasy and highly suspicious, but fortunately did not stop; and in another moment, to my joy, the big stag came slowly behind them, and offered a fair broadside in the very spot where I should have wished him to stand. The bullet took him through the ribs, certainly a trifle too far back, but he gave in at once, and rolled 150 yards down the hill, fortunately without hurting his horns. A really fine Highland stag in his prime; weight, 16 stone 2 lbs., with a good wild head of ten points, and good cups on the top."

"*Thursday, October 5th.* — We negotiated the stiff climb, and McLeish, leaving me behind a rock on the summit, returned some distance to signal directions to the pony-man. He came back just as the stag returned roaring down the pass he had ascended; and as the mist was blotting out the landscape, I feared he would come right on to us without being seen, but, as luck would have it, he stopped and recommenced bellowing within seventy yards. I never heard a stag make such a row, but nothing of him could we see. It was most exciting, lying flat on a slab of rock, hoping devoutly that the mist would rise, if only for a few seconds. The tension had grown extreme, when there was a momentary lift in the gloom, and I made out the dim forms of the deer just as a big hind, which I had not noticed, 'bruached' loudly within twenty yards of us. The outline of the stag was barely visible when, after carefully aiming, I pressed the trigger, knowing that a moment later there would be no second chance. At the shot the deer at once disappeared, but I felt sure I had hit him, and, on following the tracks for some fifty yards, there he lay as dead as a door-nail. Weight, 13 stone 6 lbs.; a wild head of ten points; thin, and evidently that of a deer on the decline."

In England the wild red deer are hunted with stag-hounds on Exmoor, and first-rate sport is obtained on the great moorlands of Somerset and Devon. During the last fifty years the deer have much increased in numbers, and no less than three packs — the Devon and Somerset, Sir John Heathcoat-Amory's, and Mr. Peter Ormrod's — are now engaged in hunting

them. In the five years ending in 1892, 276 deer were killed by the Devon and Somerset hounds.

The young of the red deer are in Europe usually dropped in June. The fawn is dexterously concealed by the hind amid the heather, and is left in concealment during the day. Scrope, a great authority on these animals, states that the hind induces her fawn to lie down by pressure of the nose: "It will never stir or lift up its head the whole of the day, unless you come right upon it, as I have often done; it lies like a dog, with its nose to its tail. The hind, however, although she often separates herself from the young fawn, does not lose sight of its welfare, but remains at a distance to windward, and goes to its succour in case of an attack of the wild cat or fox, or any other powerful vermin."

On the Continent far finer examples of red deer are to be found than in the British Isles, and the antlers and records of weights preserved at the Castle of Moritzburg in Saxony, and elsewhere, show that two hundred years ago the stags of Germany were far superior even to those of the present day, which are much heavier and afford finer trophies than do the Highland red deer. Even in Germany, however, marked deterioration has taken place during the last two centuries. A stag, for example, killed by the Elector of Saxony in 1646 weighed not less than 61 stone 11 lbs.; while from the Elector's records between 1611 and 1656 it appears that 59 stags exceeded 56 stone, 651 exceeded 48 stone, 2,679 exceeded 40 stone, and 4,139 exceeded 32 stone. These figures are given by Mr. W. A. Baillie-Grohman, a distinguished sportsman, in a very interesting chapter contributed to the "Big Game Shooting" volumes of the Badminton Library.

This deterioration among the red deer of the forests of Central and Northern Europe is, however, not traceable among the red deer of the wild mountainous regions of Austria-Hungary

By permission of the New York Zoological Society

AMERICAN WAPITI

In the United States this species is universally miscalled the Elk

Photo by W. P. Dando [*Regent's Park*

ALTAI WAPITI

This is one of several Asiatic forms of the wapiti

and South-eastern Europe. Here, at the present day, stags of enormous size and weight are still to be found. In the Carpathian Alps, for example, red deer stags are still to be shot scaling more than 40 stone (clean) in weight. Climate and feeding have, of course, much to do with the weight of stags and the size and beauty of their antlers. The Carpathian stags have enormous range, rich food, and, as Mr. Baillie-Grohman points out, are suffered during the summer to "make undisturbed raids upon the rich agricultural valleys . . . the feudal sway exercised by the great territorial magnates permitting the deer to trespass upon the crops with impunity, and thus grow to be the lustiest of their race."

In addition to the British Islands, the red deer of Europe is found on the Island of Hitteren, on the western coast of Norway, in the south of Sweden, and in Germany, Russia, France, Spain, Austria-Hungary, Turkey, and Greece.

In Corsica and Sardinia a local and smaller race is found, probably closely allied to the stag of North Africa. The BARBARY STAG is somewhat smaller than its first cousin of Europe, and carries antlers which usually lack the second, or bez, tine. The colour of this stag is "a dark sepia-brown, a little lighter and greyer on the back. Faint yellowish spots can occasionally be distinguished on the fur in the adults," says Sir Harry Johnston. The hinds are of the same colour as the stags, but lack the grey tint on the back. These fine deer are found in Algeria and Tunis, their habitat being chiefly in pine and cork forests. They are found also in parts of Morocco, near the frontiers of Algeria and Tunis, where their range extends from near the Mediterranean to the verge of the Sahara Desert. Formerly the Barbary stag was hunted by the Arabs on horseback by the aid of greyhounds. In Tunis, where it is protected by the French, it is now fairly abundant.

THE MARAL AND KASHMIR STAG

The CASPIAN RED DEER, or MARAL, is a magnificent sub-species, incomparably the finest representative of the red deer species. Standing about 4 feet 6 inches at the shoulder, a good stag will weigh as much as 40 stone clean, in exceptional specimens probably a good deal more. The range of this noble beast includes the Caspian provinces of North Persia, Transcaucasia, the Caucasus, and the Crimea. There can be little doubt that the great stags shot in the Galician Carpathians are Caspian red deer, and not the ordinary red deer of Western Europe. The red deer of Turkey is, too, no doubt referable to this sub-species.

Continuing our survey of typical deer, we come to the KASHMIR STAG, which is a magnificent beast, standing as much as 4 feet 4 inches at the shoulder, and carrying antlers approaching the red deer type, which measure in fine specimens from 45 to 48 inches. The Kashmir stag, often miscalled Barasingh by Indian sportsmen, makes its home in the forest regions of the north side of the Kashmir Valley, ranging chiefly on altitudes of from 5,000 to 12,000 feet.

The summer coat is rufous; in winter the pelage is of a darkish brown. The Yarkand stag is an apparently allied species, found in the forests bordering on the Yarkand or Tarim River.

Two more stags close the list of those Asiatic deer which approximate more or less closely to the red deer type. These are the SHOU, or SIKHIM STAG, and THOROLD'S DEER, concerning neither of which animals is much known at present. The shou, of which only the head has yet been brought to England, appears to be a very large stag, in size approximating to the gigantic wapiti. The antlers are very large, extending to as much as 55 inches over the outer curve. So far as is at present known, this great deer is found in the country "north of Bhutan and the valley eastward of Chumbi, which drains northward into the Sangpo." No European hunter, it is believed, has ever yet levelled a rifle or even set eyes on this noble deer.

In England Thorold's deer is known from two specimens shot by Dr. W. G. Thorold, during a journey across Tibet, at an elevation of about 13,500 feet. The high Tibetan plateau and other adjacent parts of Central Asia form the habitat of this species. In size Thorold's deer is about on a level with the Kashmir stag: the coat is dark brown; the antlers are distinctive in their backward curve, in the lack of the bez tine, and their flattened appearance. The muzzle and chin are pure white, as is the inner surface of the ears.

WAPITI

WAPITI are the giants of the red deer group, carrying enormous antlers, and attaining as much as 1,000 lbs. in weight. The true wapiti of North America, known in that country chiefly by the local name of Elk, carry by far the finest and the heaviest heads of any of the typical deer kind. Mr. Rowland Ward, in his book "Records of Big Game," gives the length of antlers of a twelve-pointer shot in the Olympic Mountains, Washington State, as 70 inches over the outer curve; while another specimen, also a twelve-pointer, taken from a wapiti shot in Wyoming, measures 66 inches. Occasional heads bear as many as 17, 19, and even 20 tines, or points, but from 12 to 14 points are more usual in fine average heads. A good stag will stand from 5 feet 4 inches to 5 feet 8 inches at the shoulder. Magnificently shaped, splendid in form and bearing, as in the size of its antlers, a more lordly creature than the stag wapiti does not pace the earth.

"The wapiti," says Colonel Theodore Roosevelt in "The Encyclopædia of Sport," "is highly polygamous, and during the rut the master bulls gather great harems about them and do fierce battle with one another, while the weaker bulls are driven off by themselves. At this time the bulls are comparatively easy to approach, because they are very noisy, incessantly challenging one another by night and day. Settlers and hunters usually speak of their challenge as 'whistling,' but this is a very inadequate description. The challenge consists of several notes, first rising and then falling. Heard near by, especially among unattractive surroundings, it is not particularly impressive, varying in tone from a squeal to a roar, and ending with grunts; but at a little

Photo by G. W. Wilson & Co., Ltd. [*Aberdeen*

MANCHURIAN WAPITI CALLING

The great size of the fourth tine, characteristic of the species, is very noticeable

distance it is one of the most musical sounds in nature, sounding like some beautiful wind instrument. Nothing makes the heart of a hunter leap and thrill like the challenge of a wapiti bull, as it comes pealing down under the great archways of the mountain pines, through the still, frosty, fall weather; all the more if it be at night, under the full moon, and if there is light snow on the ground."

Wapiti in North America have suffered much from persecution, and it is now difficult indeed to secure fine heads like those that fell to hunters twenty or thirty years since. Twelve or fifteen years ago, during winter-time, bands of wapiti in Colorado, Wyoming, and Montana were to be seen gathered together to the number of thousands; now a score or two is the rule, where these animals are to be found at all. However, by those who know where to go for their game, and can hold a rifle straight, wapiti are still to be obtained.

Mr. Selous, in his "Sport and Travel, East and West," thus describes a recent experience: "After a few seconds of agonising suspense a noble-looking monarch of the mountains walked slowly from the shelter of the pine-trees and followed the ladies of his household, who had now halted about fifty yards down the slope, passing in quite open ground not more than sixty or seventy yards below me; and as the stag followed them, I waited until he came past, though he had been well within shot ever since he came out from among the trees. As he did not know where I was, and probably had not the least idea why the hinds had trotted off, he came along very leisurely, looking magnificent; for although his antlers were but moderate in size, there were no others of larger proportions near to dwarf them, and even a very ordinary wapiti stag, seen at short range in its native wilds, is a glorious sight to look upon. I let him get a little past me, and then put one of Holland's peg-bullets just behind his shoulder, low down. I saw by the convulsive rush forwards that he made that he was struck through the heart, but I did not expect so large an animal to collapse so quickly. He had not gone twenty paces after being hit, when he fell suddenly right on to the prostrate stem of a large tree, which did not, however, stop him, as the impetus of his fall carried him over it, and he then went sliding at a terrific pace down the steep snow-slope below, and disappeared from sight almost immediately." The dead wapiti was ultimately found 500 feet below, with the antlers, strangely enough, scarcely injured, but the body and quarters much bruised by the fall. He was "a very pretty fourteen-pointer of moderate size."

Photo by C. Reid [*Wishaw, N.B.*

AN AXIS HIND

A species spotted at all seasons

A fight between two wapiti stags is a terrific encounter. "With heads lowered between their fore feet," says Mr. Perry, "the two adversaries walk around, waiting for an opening; and when one is thrown off his guard, the other makes a savage rush; but his opponent instantly recovers, counters the charge, and as they rush together the antlers strike each other with such terrific force that the report can be heard for a long distance. Slowly retreating, bellowing, grumbling, and grinding their teeth in a paroxysm of rage, they again circle round. . . .

By permission of the New York Zoological Society

A STAG AXIS, OR INDIAN SPOTTED DEER

One of the most common animals in an Indian jungle scene

The challenging wapiti usually does most of the offensive fighting until he finds (if such be the case) that he is the weaker; then he suddenly retires, bellowing as he goes." In the old days the Indians of North America were in the habit of organising great wapiti drives. Entire herds were surrounded by a ring of mounted men, and forced over precipices.

In recent years it has been discovered that wapiti are also denizens of certain parts of Asia. At least two sub-species — the ALTAI WAPITI and the MANCHURIAN WAPITI — have thus far been identified. The former, sometimes known as the Thian-shan Stag, is found in the forests of the Altai and Thian-shan Mountains, west of the Mongolian Desert. Compared with its American congener, it is inferior in stature, has shorter legs, a longer body, and proportionately larger antlers, though none have yet approached those of the longest American specimens. These splendid stags, of which living specimens have been maintained by the Duke of Bedford at Woburn, are captured alive by the Altai natives, and kept in domestication for the sake of their antlers, which are sold in China for purposes of medicine at as much as the value of $50 apiece.

By permission of Professor Bumpus] *[New York*

A SPOTTED ORIENTAL DEER

One of the numerous Philippine species

The MANCHURIAN WAPITI, or LUEHDORF'S STAG, is a well-marked local race of the wapiti, which turns reddish in summer. It has received several names, and is well characterised by the form of its antlers. It has been kept alive in the Duke of Bedford's park at Woburn Abbey. It seems probable that the Siberian stags will eventually be referred to the wapiti group.

BOKHARA DEER

A fine deer from Russian Turkestan is at present known as the BOKHARA DEER. It is said to resemble the shou of Northern Bhutan more than any other species, and, standing about 4 feet at the shoulder, is of an ashen-grey colour, tinged with yellow. A living specimen has been exhibited at Moscow, and it is believed that specimens in the collection of the Duke of Bedford belong to this form.

SIKAS

The SIKAS, as typified by the JAPANESE DEER, are a group of deer of moderate size, distinguished from the preceding assemblage by antlers of simpler type, each antler having usually four points, and lacking the second, or bez, tine. The coat is spotted with white, and white markings appear about the tail. The tail is much longer than in the red deer group. The Japanese deer, found in Japan and North China, is a beautiful creature, somewhat smaller than the fallow deer of Europe, having a coat of brilliant chestnut, thickly spotted with white in curious longitudinal markings. This is the summer pelage; in winter the colour changes to dark brown, and the spots mostly disappear. When in the velvet, the antlers are of a bright chestnut-red, with black tips, and at this season the bucks look their handsomest. A good head measures from 25 to 31 inches, and carries usually eight points.

The MANCHURIAN SIKA may be looked upon as a larger variety of the Japanese deer, with a somewhat darker coat.

Photo by the Duchess of Bedford, Woburn Abbey.

FALLOW DEER.

There are two breeds of these beautiful deer in the British Isles; in the one the summer coat is fawn dappled with white; in the other the colour is dark brown at all seasons.

Another closely allied form is the FORMOSAN SIKA, which bears a rather paler summer coat, and carries spots in its winter pelage. This deer is found on the mountains of the island from which it takes its name. The few antlers which have reached this country seem to indicate that in this respect this deer is inferior to the other sikas. The longest pair yet recorded measure not more than 19¾ inches.

The PEKIN SIKA, sometimes known as Dybowski's deer, is considerably larger in size than the rest of the group, standing well over 3 feet at the shoulder. The horns are large and rugged, and measure as much as 27 inches in length. The coat is thick and shaggy, and well adapted for life in a harsh climate. The habitat of this species is North-eastern Manchuria and the borders of Korea.

FALLOW DEER

FALLOW DEER are, perhaps, to English people, the most familiar of all the cervine race, forming as they do, in the semi-domesticated state, the adornments of many English parks. The flesh of this handsome deer furnishes the well-known venison of this country, and is perhaps the best-tasted of all deer-meat. A good fallow buck stands about 3 feet at the shoulder, and weighs (clean) about 150 lbs., though specimens have been shot weighing as much as 204 lbs.,

Photo by C. Reid] [*Wishaw, N. B.*

A YOUNG FALLOW BUCK OF THE BROWN BREED

The favourite park-deer of England

but this is exceptional. The horns are strongly palmated. Originally this deer was not indigenous to Britain, but is often said to have been introduced by the Romans from Eastern Europe.

The COMMON FALLOW DEER is found in the wild state in Spain, Portugal, Greece, Austria, Rhodes, Sardinia, Asia Minor, and North Palestine. It is doubtful whether, as has been stated, this deer ever existed in modern times in the wild state in North Africa. This is a highly gregarious species, delighting to move in considerable herds. In some parts of Scotland fallow deer have reverted completely to the wild state, and afford excellent sport. And even park-

Photo by Miss E. J. Beck

A SAMBAR STAG

The only Indian deer of which the fawns are unspotted

deer, once they are shot at, exhibit extraordinary wariness and cunning, so much so that curious tricks and disguises have often to be resorted to when a fat buck has to be shot for venison.

The beautiful MESOPOTAMIAN FALLOW DEER, found in the mountains of Luristan, in Mesopotamian Persia, is somewhat larger than the common species, while its coat is much more brightly coloured. The antlers bear little resemblance to those seen in the park-deer of this country, being far less palmated and spreading, and more vertical.

The enormous horns of the extinct deer once known as IRISH ELK are now considered by naturalists to be those of a gigantic species of fallow deer. By the kindness of Mr. J. G. Millais, I am enabled to give the dimensions of a pair of antlers of one of these wonderful beasts from his museum. These antlers measure in spread, from tip to tip, 9 feet 4 inches; length round inside of right horn, 6 feet; round left horn, 5 feet 8 inches,—a marvellous trophy, truly. This specimen was dug up in County Waterford. These colossal fallow deer, which roamed the wastes of Ireland in prehistoric times, must have afforded fairly exciting sport to the feebly armed human beings who then existed.

THE SAMBAR, OR RUSINE DEER

SAMBAR may be shortly described as large deer, having rough, shaggy coats, and big, rugged antlers of simple type, usually displaying but three tines. They belong to the group known as Typical Deer, although they are but distantly connected with the red deer. The colour of the coat is usually dark umber-brown, marked with chestnut about the rump and under-parts. The well-known sambar of India stands as much as 5 feet 4 inches at the withers, and weighs, before being cleaned, some 600 lbs. The longest pair of antlers yet recorded (Rowland Ward's "Records of Big Game") measure 48 inches in length over the outer curve. Usually to be found among jungly, wooded hills and mountains in many parts of India and Ceylon, this fine stag affords first-rate sport, and is much sought after by shikaris. It is to be met with in small

troops of from four to a dozen, or singly, while during the rutting-season the animals rove in more considerable herds. In jungle and thickly forested regions it is a hard matter to come up with the sambar on foot, and it is there usually shot from elephant-back, by the aid of beaters. In more open hill country it affords good stalking. In Ceylon it is hunted with hounds, and yields in this way also capital sport. These animals seem to revel in heat, and love to shelter themselves in hot, stifling valleys; they drink only once in two or three days. It is a noticeable feature in connection with the antlers of the sambar that they are not invariably shed annually, as with most of the deer kind. In Ceylon, according to Sir Samuel Baker, they are shed "with great irregularity every third or fourth year."

Lieutenant-Colonel Reginald Heber Percy thus writes concerning the sambar, or sambur: "Compared with the Kashmir stag, red deer, or wapiti, he looks like an ugly, coarse, underbred brute. . . . As the sambur is almost entirely noct rnal in its habits, it is most commonly shot in drives, and in many places it is almost impossible to obtain sambur otherwise; but where it can be managed, stalking is, of course, far better fun. The sportsman should be on his ground just before daylight, and work slowly through the forest at the edge of the feeding-grounds, taking the bottom of the hill if there are crops on the plain below, or, failing these, the edges of the open glades in the forest. Presently, if there are any sambur about, he will hear their trumpet-like call, and, creeping on, see two or three dark forms moving among the trees. In the grey of the morning it is often very hard to distinguish a stag from a hind, and the writer has on several occasions had to wait, after viewing the herd, till there was light enough to pick his stag. Even in broad daylight it is difficult to judge the size of a stag's horns as he stands motionless in the deep gloom of the forest, and what little can be seen

Photo by Miss E. J. Beck

FORMOSAN SIKA STAG

Like its Japanese kindred, this deer is spotted only in summer

Photo by the Duchess of Bedford

JAVAN RUSA STAG

This deer is a near relative of the sambar, but has a somewhat different type of antler

[Photo by the Duchess of Bedford] [Woburn Abbey

HOG-DEER

The smallest Indian representative of the sambar group

of them makes them look three times their real size — the beam is so massive and the tines so long. The stag, too, is such a big beast, standing nearly a hand taller than a barasingh, that if seen in the open he looks as big as the Irish elk. . . . All driving should be done during the heat of the day, when the animals are lying down; trying to drive when beasts are naturally on the move generally results in the game leaving the beat before the men are in their places. It may sound ridiculous for a man to get up a tree in a sambur drive, but he is far more likely to get an easy shot in this position, as the deer will neither see nor wind him; he commands more ground, and he runs no risk of heading back the wary old hind which often leads the herd, the chances being that if he is rightly posted the herd will come right under his tree. Another advantage is that, his fire being plunging, he can shoot all round without danger to the beaters. In some parts of the Himalaya native shikaris declare that they often shoot sambur by selecting a likely path and improvising a salt-lick, after the fashion of Laplanders when they want to catch their tame reindeer." The flesh of this deer is coarse and only moderately good eating.

The MALAYAN SAMBAR, found from Assam, through Burma, to the Malay Peninsula, and in Siam, Hainan, Borneo, and perhaps Sumatra, is slightly less in size than its Indian prototype; the antlers vary somewhat, and are shorter and stouter. The longest antlers yet recorded measure $30\frac{7}{8}$ inches over the outer curve; these come from Borneo.

The FORMOSAN SAMBAR, sometimes called Swinhoe's Deer, is, again, closely connected with the Malayan sambar, and may be looked upon as purely a local race. The antlers appear to run smaller, the best recorded examples only extending to $19\frac{3}{4}$ inches.

The LUZON SAMBAR (Philippines), a small sub-species, and the SZECHUAN SAMBAR (North-west China), are also local races of the same species. This last seems thus far to occupy the most northerly habitat of this group.

The BASILAN SAMBAR (Philippines) is, like its congener of Luzon, a small sub-species, standing no more than from 24 to 26 inches at the shoulder, of slender build, and with the hindquarters higher than the withers. The best antlers yet recorded measure no more than $15\frac{1}{2}$ inches. It is interesting to note that as the island of Basilan is the smallest of the Philippines, so is this sambar by far the smallest of its group. Its restricted habitat has no doubt conduced, during long ages, to bring about this result.

The JAVAN SAMBAR, or RUSA, is a distinct species, found, as its name implies, in the island of Java. The antlers are somewhat slender, but are, next to those of the sambar of India, the longest of the group The best recorded pair measure $35\frac{1}{2}$ inches, while another pair from Mauritius, where this animal has been introduced, measure half an inch longer. This sambar is smaller than the great sambar of India, and is about on a par with a good red deer.

The MOLUCCAN RUSA, a sub-species somewhat smaller than the Javan deer, is found in

Celebes and certain islands — Boru, Batchian, and Amboina — in the Moluccan group; while the TIMOR RUSA, a closely allied congener, is found on the islands of Timor, Semao, and Kambing. It is possible — nay, even probable — that the Malays may, in times gone by, have introduced certain of these rusine deer from one habitat to another. Such, at least, seems to be the presumption among naturalists.

Dr. Guillemard, in that charming book "The Cruise of the Marchesa" (p. 357), gives some interesting information concerning Moluccan sambar in the little-known island of Batchian. The inhabitants, "living for the most part in the hills, kill and smoke the deer, and bring the meat into the villages for sale. We were fortunate enough to assist at one of their hunts, in which no other weapon than the spear is used. The side of a large ravine, which had been partially cleared, and presented a confused jumble of fallen trees and low brushwood, was assigned to us as our post, and, from the extensive view it commanded, we were able later in the day to watch one run almost from start to finish, although at first the sport appeared to be successful in every direction but our own. At length a stag broke covert about five hundred yards above us, and descended the slopes of the ravine, but shortly afterwards turned and made for the forest again. He was met by some of the hunters and driven back; but the dogs were now in full cry, and pressed him hard, the hunters meanwhile racing at their utmost speed above, in order to prevent his regaining the jungle. He now altered his direction, and turned down once more towards us; but the fallen trees were so thick that the dogs gained rapidly on him. He made one more effort for his life by doubling, but it was too late, and in another minute the dogs and hunters had fairly run him down."

Deer were probably the earliest animals of the chase. Their bones are found in the cave-dwellings of prehistoric man, and some of the earliest efforts at drawing represent these animals.

YOUNG MALE SWAMP-DEER

This species is the Barasingh of the natives of India. It is by no means addicted to swampy localities

INDIAN MUNTJAC

Sometimes called the Barking-deer. The Indian species stands only 2 feet high

Other Typical Deer

So numerous are the typical deer that they are not concluded even by the long list of animals already enumerated. We proceed now to glance briefly at the remainder of this important group.

The Philippine Spotted Deer, or Prince Alfred's Deer, is a small but extremely handsome species, found in the islands of Samar and Leyte. The height is under 30 inches; the colour very dark brown, spotted with white, the under-parts, chin, and upper portion of the legs also white.

Another small cervine from the Philippine group is the Calamianes Deer, a darkish brown beast, found in the island of that name.

The little Bavian Deer, another island-deer, from the Bavian group, between Borneo and Java, should also be mentioned. Very little is known of the habits of these three deer, and few specimens even of their skins and horns have reached Europe.

The Hog-deer, allied to the last-named species, is an animal much better known, found as it is in many parts of India and Burma. This handsome little deer stands from 24 to 28 inches at the shoulder, and carries antlers which average from 10 to 15 inches, and reach occasionally as much as 21 or 22 inches — one specimen is recorded measuring 23¼ inches. It has a yellowish or reddish-brown coat, minutely speckled with white. The summer coat is paler and marked with white or palish-brown spots. This sturdy little deer is found usually in long grass, and affords excellent snap-shooting; it is also run into with dogs and speared by mounted sportsmen. Major Fitz-Herbert thus describes a chase of this kind: "He [the little stag] stood at bay, with head down and bristles raised like a miniature red deer of Landseer's, but broke away when I came up. Once he charged the bitch and knocked her over. He stood at bay two or three times, but I could never get a spear into him for fear of hurting the dogs. At last one time, as he was breaking bay, I came up, and he charged me with such force as to break one of his horns clean off against the spear. However, I struck him in the spine, and rolled him over." These little deer have quite extraordinary pluck, and have been known even to charge and wound a horse.

The Chital, or Indian Spotted Deer, often called the Axis Deer, a very beautiful species, is the common jungle stag of India. Standing about 3 feet or a little over, its lovely coat of bright reddish fawn is thickly spotted with white at all seasons of the year. The horns are somewhat of the sambar type, and measure as much as 36 or 38 inches in length in fine specimens. These exquisite deer are often found in considerable herds, and are a forest-loving species.

YOUNG MALE CHINESE WATER-DEER

One of the few deer which have no antlers

The SWAMP-DEER, the true Barasingh of India, as distinguished from the Kashmir stag, which is often loosely called Barasingh, is a plain-loving species, found in various parts of India, and characterised by handsome antlers, bearing as many as from 10 to 16 points. This is a big, heavy deer, standing nearly 4 feet at the withers, and weighing as much as 560 lbs. The summer coat is light rufous, more or less spotted with white. The winter coat is yellowish brown. A near relative to this deer is SCHOMBURGK'S DEER, found in Northern Siam. The antlers of this stag are most curiously forked and bifurcated.

MALE SIBERIAN ROE

A very large species of roebuck, with more rugged antlers than the European roe

The THAMIN, or ELD'S DEER, sometimes called the Brow-antlered Deer, is another plains-deer, found chiefly from Manipur, through Burma, to the Malay Peninsula. It is a good-sized species, standing about 3 feet 9 inches at the shoulder, and weighing as much as 240 lbs. The large antlers are simple in type, the brow-tines curving down curiously over the forehead; the tail is sharp, and the neck provided with a mane, the young being spotted. A Siamese race of Eld's deer, found in Siam and Hainan, differs somewhat from the Burmese type.

THE MUNTJACS

FEMALE SIBERIAN ROE

The absence of a tail, characteristic of all roes, is well shown

The MUNTJACS, or BARKING-DEER, are a group of small deer found in India, Burma, and the Malay region. The INDIAN MUNTJAC stands about 2 feet in height, and weighs some 28 lbs. The antlers, which average 5 or 6 inches in length, bear two points — brow-tine and beam; the lower portions, or pedicles, are curiously covered with hair, and the front of the face is ribbed or ridged in V fashion. The general colour is a golden bay, the face and limbs brown, and the lower parts white. The buck has sharp tusks in the upper jaw, and, at a pinch, knows how to make use of them. A shy, stealthy little creature, the muntjac loves dense cover, and the sportsman usually obtains but a quick snapshot at this active and wary little deer as it flashes across him much as does a bolting rabbit scuttling across a narrow drive. Local Indian names for the barking-deer are Jungle-sheep, Red Hog-deer, and Rib-faced Deer. Other muntjacs, varying somewhat from the Indian form, are the HAIRY-FRONTED, the TENASSERIM, the TIBETAN, and the CHINESE MUNTJACS.

By permission of Herr Carl Hagenbeck] [*Hamburg*

SIBERIAN ROEBUCK

Shows a magnificent pair of antlers

Tufted Deer

Near relatives of the odd little muntjacs are the Tufted Deer, of which two species, the Tibetan and Michie's, are known to naturalists. The former, found in Eastern Tibet, is about the size of the Indian muntjac, and has a coat of dark chocolate-brown, curiously speckled on the face, neck, and fore parts; the frontal tuft is nearly black. The antlers of the bucks of both this and Michie's deer are extremely small, scarcely observable at a first glance. Both species have long curving tusks projecting from the upper jaw. Michie's tufted deer is of a greyish-black or iron-grey colour, the face and neck dark grey. This animal is found in the reed-beds bordering the Ningpo and other rivers in Eastern China.

Water-deer

The Chinese Water-deer is another diminutive deer, standing no more than 20 inches at the shoulder. The body-colouring is pale rufous yellow, the head and the back of the ears being darker in hue than the rest of the body. The males carry no antlers. This tiny deer is found in North-east China, and is well known on the islands of the Yangtse-kiang River. It loves thick cover, especially reeds and long grass. So apt is it at concealment, that in one park, where specimens are kept in a paddock of long tussocky grass, hours may be spent without catching a glimpse of it. When disturbed, it scurries off with short, quick leaps, very much after the manner of the hare. The males of the Chinese deer, like the muntjacs, carry long curved tusks in the upper jaw.

Roe Deer

The European Roe, one of the handsomest of all the smaller deer, is still happily found in many parts of Scotland. In England, where it had at one time become well-nigh extinct, it has been here and there reintroduced with some success. In Ireland it seems never to have been found. On the Continent its range is wide, extending from the south of Sweden, through France and Germany, to Italy, Greece, Turkey, Austria-Hungary, and Spain. Found in Southern Russia and the Caucasus, it makes its way eastward as far as North Palestine and Persia. The roe stands, in good adult specimens, 26 inches at the shoulder, and weighs about 60 lbs. The handsome and very characteristic horns measure in good specimens from 10 to 13 inches over the outer curve. The summer coat of this beautiful little deer is a bright rufous brown; in winter a darker and duller brown, with a notable white patch about the tail. The roe is always more or less a wood-loving creature. In winter, especially, it seldom cares to quit the shelter of the forest; in summer, however, the deer wander into more open localities. The fawns are born generally towards the end of May, and two young are usually produced. In the rutting-season the males fight savagely with one another.

Mr. J. G. Millais gives an instance of a buck killed in one of these desperate battles, in which one antler of the victor, having penetrated the brain of the vanquished buck, had been

Photo by Ottomar Anschütz] [*Berlin*

FEMALE EUROPEAN ROE DEER

Though common in the Scotch woods, these deer are rarely seen, keeping close in cover all day

broken clean off and remained embedded in the skull, firmly wedged between the ears and the antlers. "When wounded and brought to bay by a dog," says Mr. Millais, "a roebuck brings into play both head and fore legs in his defence, using his horns as described, and striking out with his legs, more as if to push off his antagonist than to cause a forcible blow, for he gives no shock, as a hind can. A doe, too, uses her fore legs and boxes with her head; and Mr. Steel, who has had wide experience in roe-shooting, tells me that he has seen a doe use her hind legs as well. The bark of the buck is loud, sharp, and deep in tone, not unlike what a single call might be from an old collie. At this season, too, the female gives an amorous call when she wishes the male to come to her. If he is within hearing, he puts his neck out straight and comes full speed to her. In Germany many roebucks are shot by alluring them in this manner, and calls exactly imitating her voice are made for the sportsman's use. One who has shot roe in this manner tells me it is most exciting sport, for the buck comes straight

PÈRE DAVID'S DEER

Nineteen of these deer are in England; three are at Berlin. It is believed that these are the only deer of this species in existence

for the sound at full speed, and will only stop startled for a second when he discovers the fraud, and as often as not he passes right on without giving a chance."

Roe have a curious trick of chasing one another in play, and certain roe-rings in the woods near Cawdor Castle, according to Mr. Millais, demonstrate the fact that for ages the deer have been in the habit of disporting themselves in these strange circles over the same pieces of ground. The fact is very singular. "These curious circles are most used in early summer; and Sutherland, the head keeper, tells me," says Mr. Millais, "that hardly a morning passes without there being one or two roe playing in the rings, and sometimes there is quite a party of them." Roe feed chiefly on grass; they will eat also rowan (mountain-ash) berries, of which they are especially fond, as well as turnips, grain, heather tops, and various other roots and plants. Certain fungi, to which they are partial, they take much pains to dig out with their sharp hoofs. "A roebuck that I once kept," says Mr. Millais, "was a good Scotchman, though he had a beastly temper, for he liked nothing so much as oatmeal porridge." Roe make delightful pets, but the bucks are not to be trusted after the third year. One of these animals, supposed

GROUP OF VIRGINIAN DEER (TWO BUCKS, FOUR DOES)

These are the common deer of the Eastern United States

to be tame, has been known to kill a lad. In Scotland and on the Continent roe deer are usually killed by driving, and large bags are often made. Even within recent times, as many as sixty-five roebucks and thirteen hinds have been shot during a day's driving. Shot-guns are employed for this kind of sport. Stalking the roe is not so much pursued in Scotland as it might be. It is a first-rate and most interesting form of sport, and in certain districts the rifle might very well be substituted for the shot-gun. "Roe-stalking," says Mr. Millais, "possesses many charms of its own. In the first place, you can enjoy it at a season when there is no other shooting going on; secondly, it takes you out in the early morning, when all nature is full of life and beauty, and before the heat of the day commences; and, thirdly, where the chase of the animal is systematically conducted, as with red deer, the nature of the sport is everything that can be desired. I would therefore put forward a plea that tenants and owners of part-wood, part-forest lands in Argyll, Inverness, Ross, and Aberdeen should turn their attention to stalking the roe in preference to killing them during the usual winter wood-shoots." Roe deer are exceedingly abundant in the great forest regions of Germany and Austria-Hungary. In Austria alone, not including Hungary, during the year 1892, no less than 68,110 of these beautiful little deer were shot on various estates.

The SIBERIAN ROE, found from the mountains of the Altai and Turkestan to Siberia, is a somewhat larger species than its European cousin, measuring from 28 to 34 inches at the shoulder. The antlers are also larger, extending to as much as 16 and even 18 inches in measurement. As beseems its habitat, the coat of this species is also thicker and rougher than is the case with the European roe. Mr. Lydekker gives some interesting particulars regarding this animal: "When the snows of November fall, the roe themselves commence to collect in herds, which may number from 300 to 500 head, and soon after migrate southwards into Manchuria, whence they return about the end of March or beginning of April. On the Ussuri, which they must cross, they are at this season slaughtered in thousands by the hunters, without regard to age or sex."

One other species, the MANCHURIAN ROE, found chiefly in mountainous habitats, whence it never descends, should be noted. This is a smaller deer than the Siberian roe, and approximates in size and length of horn to the European race.

PÈRE DAVID'S DEER

This remarkable animal, which apparently bears little or no resemblance to any of the other deer of the Old World, has been placed by some naturalists between the roe deer and the American deer. Its habitat is North China, and, strangely enough, it seems to be unrecognised

By permission of Professor Bumpus] *[New York*

A MULE-DEER FAWN

The large ears, from which the American species takes its name, are noticeable even in the young

in the wild state, being apparently only known in China in the Imperial Park at Pekin. This deer approaches in size the red deer of Europe. The general colouring is greyish brown, white about the eyes, ears, rump, and under-parts; the horns, which lack the brow-tine, are very singular in shape, and measure as much as 32 inches in length; the tail is long, reaching to the hocks; the gait is "lolloping" and mule-like. This is a marsh-loving species, and at a certain park, where specimens are kept, "they may be seen wading far into the lakes and even swimming in the deeper water."

The American Deer

Excepting always the elk, wapiti, and reindeer, which have been already described, the deer of North and South America stand quite apart from those of the Old World, and are placed in a genus of their own. Usually the tail is long, and the brow-tine is always wanting. The most familiar species is the common American Deer, of which the Virginian or White-tailed Deer is the type. This deer is found in varying forms in both continents, and was regularly hunted by the ancient Mexicans with trained pumas.

The well-known Virginian Deer, found in Eastern North America, and believed to range as far south as Louisiana, stands a trifle over 3 feet in height, and weighs, clean, about 175 lbs. The coloration is chestnut in summer, bluish grey in winter. The antlers are of good size, and measure as much as 27½ inches in length. As a sporting animal the white-tailed deer is not popular. Mr. Clive Phillipps-Wolley describes him as "an exasperating little beast," possessing every quality which a deer ought not to, from the sportsman's point of view. "His haunts are river-bottoms, in choking, blinding bush, and his habits are beastly. No one could ever expect to stalk a white-tail; if you want to get one, you must crawl." Mr. Selous, in 1897, bagged one of these deer somewhat curiously. "He was coming," he writes, "through the scrubby, rather open bush straight towards me in a series of great leaps, rising, I think, quite four feet from the ground at every bound. I stood absolutely still, thinking to fire at him just as he jumped the stream and passed me. However, he came so straight to me that, had he held his course, he must have jumped on to or over me. But when little more than the width of the stream separated us — when he was certainly not more than ten yards from me — he either saw or winded me, and, without a moment's halt, made a prodigious leap sideways. I fired at him when he was in the air, and I believe quite six feet above the ground." The deer, an old buck with a good head, was afterwards picked up dead. In different parts of America, as far south as Peru and Bolivia, various local races of this deer are to be found.

True's Deer is a small species, not unlike the Virginian deer, found from South Mexico to Costa Rica. The antlers are "in the form of simple spikes directed backwards," and the body-colouring is in summer light chestnut, in winter brownish grey. Little is at present known of this species.

The Mule-deer, found in most parts of North America west of the Missouri, as far south

as Southern California, stands about 3 feet 3 inches at the shoulder, and weighs over 240 lbs. It carries good antlers, measuring as much as 30 inches, and in colour is tawny red in summer, brownish grey in winter. It is a far better sporting animal than the sneaking white-tailed deer, and affords excellent stalking. These deer are still abundant in many localities. Mr. Phillipps-Wolley writes thus of them in "Big Game Shooting": "Some idea of the number of these deer in British Columbia may be gathered from the fact that in one district I have had a chance of killing seventeen separate stags in an hour's still hunt, whilst one settler in the Similkameen country fed his hogs on deer-meat through a whole winter." Four races of mule-deer — the TYPICAL, the CALIFORNIAN, the LA PAZ, and the WESTERN DESERT race — have been identified by naturalists.

The BLACK-TAILED DEER is another well-known cervine of Western North America, closely allied to the mule-deer, but distinguished from that species by its inferior size and its much blacker tail. The antlers, as a rule, run somewhat smaller than in the case of the mule-deer. This, too, is a very abundant species, affording fairly good sport (considering its liking for timber and dense bush) and excellent venison.

In South America are to be found several kinds of marsh-deer, of which the best known is the handsome MARSH-DEER, having its range from Brazil to the forest country of the Argentine Republic. Little is known of this and other South American deer by British sportsmen. The marsh-deer is almost equal in size to the red deer of Scotland, but somewhat less stout of build; the colouring is bright chestnut in summer, brown in winter; the coat is long and coarse, as befits a swamp-loving creature; the antlers usually display ten points, and measure in fine specimens as much as 23 or 24 inches.

The PAMPAS-DEER, a species closely allied to the marsh-deer, is of small size, standing about 2 feet 6 inches at the shoulder. The antlers, usually three-pointed, measure no more than from 12 to 14 inches in fine specimens. This deer is found from Brazil to Northern Patagonia.

The PERUVIAN and CHILIAN GUEMALS are small deer, found on the high Andes, and are somewhat inferior in size to the Virginian deer. The males carry simple antlers forming a single fork, and measuring about 9 inches. The coat, yellowish brown in hue, is coarse, thick,

By permission of Professor Bumpus] *[New York*

VIRGINIAN DEER

This deer is the best-known representative of a species displaying extraordinary local variation in size and colour

By permission of the New York Zoological Society

MULE-DEER STAG

Shows the large blackish-brown patch on the forehead, so distinctive of the species

and brittle. The Chilian guemal is found also in most parts of Patagonia; unlike its congener of Peru, which delights in altitudes of from 14,000 to 16,000 feet, its habitat lies chiefly in deep valleys, thick forest, and even the adjacent plains, to which it resorts in winter.

The BROCKETS, of which seven species are found in South and Central America and Trinidad, are small deer, having spike-like antlers and tufted crowns. The largest is the RED BROCKET, found in Guiana, Brazil, and Paraguay, which stands 27 inches at the shoulder. The body-colouring is brownish red. Like most of the group, this brocket is extremely shy; although fond of dense covert, it is found also on open campos. The PYGMY BROCKET, a tiny dark brown deerlet, less than 19 inches in height, found in Central Brazil, is the smallest of these very small deer.

Two other diminutive deer, known as PUDUS, closely allied to the brockets, are found in South America. These are the CHILIAN and ECUADOR PUDUS, of which the former is no more than $13\frac{1}{2}$ inches in height, the latter about 14 or 15 inches. Little is known of the history and life habits of these charming little creatures, one of which, the Chilian species, has occasionally been seen in Zoological Gardens.

THE MUSK-DEER

This brief account of the deer of the world closes with the MUSK-DEER, which differ from almost all others of their kind — the Chinese water-deer being the sole exception — in the absence of antlers. In place of these defensive and offensive weapons, nature has provided the musk-deer with long canine tusks, projecting downwards from the upper jaw. The musk, from which these curious deer take their name, is secreted during the rutting-season — in the male only — in a pouch or gland contained in the skin of the stomach.

The well-known HIMALAYAN MUSK-DEER is a stout, heavily made deer for its size, measuring 20 inches at the shoulder, about 2 inches higher at the rump, and having a coat of coarse, brittle hair of a dark brown colour. This musk-deer, which is nowadays by no means common, is found in the forests of the Himalaya, Tibet, Siberia, and Western China, often at altitudes of about 8,000 feet. These animals are extraordinary mountaineers, active, daring, and apparently quite unconscious of or indifferent to danger.

Another species, the KANSU MUSK-DEER, found in the province of Kansu, China, has only been discovered within the last ten years. Concerning this deer very little is at present known. In general characteristics it resembles its more familiar congener of the Himalaya.

A WORD should be said upon the subject of the acclimatisation of various members of the Deer Tribe in countries which are distant from their native ground, but in which they are found to thrive and breed, some with greater and some with less success. Several of the illustrations in this chapter are taken from deer living in natural conditions at an English country seat in Bedfordshire. Others were photographed out of doors in zoological parks or private menageries. There is a considerable degree of transferability among deer, not only among those found in temperate or northern regions, but also those which inhabit the tropical jungles of Southern India.

YOUNG MARSH-DEER

A very elegant South American species. The main colour is a bright chestnut, with the lower part of the legs black. The insides of the ears are filled with white hair, looking like silver filigree

The Axis, or Chital Deer of India, is the most striking example. It lives in the hot jungles, where it is the usual food of the tiger. Yet it has been transferred to the forests of France and to English parks, and not only lives, but breeds and increases in numbers. In France and Germany herds of axis deer have been maintained long enough to observe a curious and noteworthy incident in acclimatisation. The axis deer breeds naturally in October, after the Indian rainy season. This habit, if persisted in in Europe, would expose the fawn to the rigours of the French or English winter. Gradually and after some time the herds become irregular in the time of reproduction, and later produce the fawns in June, at the time which is best suited to their survival. This is a real instance of acclimatisation.

The Japanese Deer, or Sika, was introduced into the park at Powerscourt by Viscount Powerscourt some thirty years ago. Now it is one of the commonest of recently introduced park-deer both in England and in France. The venison is excellent, and the herds are prolific. The stags are small, but very strong, and at Powerscourt always get the better of the red deer stags, and sometimes carry off their hinds. Wapiti Deer are kept in several English parks, but so far the Sambar has proved a failure. Hog-deer and Chinese Water-deer do very well both in England and France.

But it is in New Zealand that the best results have been obtained with imported deer. The English Red Deer, some of which were originally sent out by the Prince Consort, reinforced by some of the same species bred in Australia, have become indigenous. They grow far faster and to a larger size than those on the Scotch moors, and rival the great stags of the Carpathians. The antlers also increase in size at an abnormal rate. Licences are regularly issued to stalk and shoot these deer, which, like the brown trout and the pheasant, are now among the stock of established wild fauna. Moose and a few Sambar stags and herds have also been turned out in New Zealand. The latter are said to be doing well.

YOUNG HIMALAYAN MUSK-DEER

The male carries a pouch on the abdomen, from which the musk is obtained. There are no antlers

There is no particular reason why the deer of cold countries should not be interchanged; they seem to have the natural adaptability of oxen. But it is not a little surprising that the species from warm climates should flourish in damp and cold ones. The axis deer would be a real addition to the fauna of the great European forests, if it is found that it survives the winter snows without some form of artificial shelter. No one seems to have considered the advisability of introducing the mule-deer into the Central European woods. It is a much finer animal than the fallow buck, and the venison is excellent. In these woods where fallow deer are preserved in a wild state, as on many of the German Emperor's sporting-estates, the mule-deer would be a far more ornamental animal. Few people know what immense herds of red and fallow deer, as well as of wild boars, still exist, under careful preservation, in the forests of the great German, Austrian, and Russian princes, and in the royal forests of their respective countries.

When the Kaiser holds his great Court hunting-parties, to which the guests all come dressed in the uniform of the Order of St. Hubert, as many as 200 deer are shot in a day. They are driven past the guns by beaters. After the day's sport is over all the antlers are wreathed with boughs of spruce fir, and the stags laid out like rabbits after an English battue.

It is rather surprising that only one species of deer has been entirely domesticated — *viz.* the Reindeer. Deer's meat is as highly prized as that of any other game, perhaps even more so. There is almost no part of the animal which is not useful. The horns are valuable for knife-handles, and always command a good price; they were prized even by prehistoric man, who converted them into pick-axes, and made spear-heads and daggers of them. The leather of the hide makes the softest and best of all hunting-garments: the American Indian or trapper always wears, or used to wear, a deer-skin shirt and deer-skin leggings, made as exquisitely soft as chamois leather by a process known to the squaws. At the present time all the best gloves are made of doe-skin; they are far the most costly of any gloves. Doe-skin breeches are also a luxurious garment to ride in. For ornamental rugs few skins beat those of the Dappled Deer, laid on the floor of some finely furnished hall or room.

Thus we have the curious spectacle of the wild men of the Far North, the Lapps and Ostiaks, taming and keeping in domestication great herds of deer, milking them, using them as beasts of draught, and feeding on their flesh, while far more civilised races in the South have not taken the trouble to do so. The reason is not easy to surmise, unless it be that the idea of making use of the Deer Tribe solely as beasts of the chase was so rooted in the European ruling races, and their kings and nobles, that the agriculturist never had a chance of trying to tame and use them for other purposes. It is certain that during the Middle Ages law and custom made any such attempt quite impossible. The deer were a valuable sporting asset, so hedged round with an atmosphere of feudal privilege, that to convert them into something useful to the common people would have been regarded as an insult to the powers that were.

Photo by Neurdein Freres] *[Paris*

THE CAMEL-PLOUGH, USED IN ALGIERS

Camels are often used for agricultural purposes in North Africa, Syria, and India. In this particular case a special kind of plough is employed

CHAPTER XVIII

THE CAMEL TRIBE AND THE CHEVROTAINS

BY W. P. PYCRAFT, A.L.S., F.Z.S.

A WHITE CAMEL

A light sandy is the common colour, though white, grey, brown, and black occur; but black camels are held by the Arabs to be worthless

THE Camels and Llamas, constituting the present group, form a very distinct section of the great assemblage of animals known as the Ruminants, or Cud-chewers. The Camel Tribe are peculiar amongst the Ruminants in that they never possess horns, and in that the stomach is only divided into three instead of four compartments — this division into compartments being intimately connected with the ruminating habit. Furthermore, the upper jaw bears cutting-teeth, or "front teeth," as they are popularly called: though the full set (three pairs) is only complete in the young, in the adult but one pair remains, the others being shed. The canine or "eye" teeth are also peculiar in their position, those of the lower jaw being separated from the cutting-teeth by a very considerable gap.

In the structure of the feet the Camel Tribe are no less peculiar; indeed, it is on this character that the scientific name of the group is founded. Only two toes are present; these are of equal size, and, instead of being protected by hoofs, are provided with a hardened skin, covering a cushion-like pad, which expands when the weight of the body is thrown upon the foot, as in walking. This is an admirable adaptation for walking on soft and yielding sands. Hoofs are represented only by a pair of broad nails.

The three-chambered stomach is remarkable because the chamber known as the "paunch" lodges in its walls a large collection of "water-cells," in which can be stored as much as a gallon and a half of water. This faculty of storing water is invaluable to an animal which has often to subsist for days on absolutely waterless deserts.

Note the slit-like nostrils in the illustration of the Bactrian Camel on page 306. These can be closed at the will of the animal, a useful precaution against the entrance of sand during the violent sand-storms which often arise in the desert.

The True Camels are distinguished by the possession of a hump or humps: there are never more than two. It is in these humps that the camel was popularly supposed

Photo by Charles Knight

ARABIAN CAMEL

This individual belongs to the heavy breed employed for carrying merchandise and baggage

to store water; in reality they are huge masses of fat, serving as a reserve store of food. The accumulation of fat for this purpose is a common feature amongst the Mammalia. Most animals which hibernate, or lap up and sleep during the winter, store up fat; but, except in the camel, it is distributed more or less evenly over the body. With hard work or bad feeding the camel's hump dwindles almost to nothing. When on the eve of a long journey, the Arab looks anxiously to the state of this hump, for on the size of this depends the animal's condition and ability to undertake the march.

The Arabian camel as a wild animal has long since been extinct. Of the hordes of so-called wild camels which abound in the desert regions of Central Asia (Gobi Steppe), some are probably descendants of domesticated animals which have escaped from captivity, but others may be aboriginally wild. From the evidence of fossil camels, there seems little doubt that this animal originated in North America—one branch of the family (the Llamas) migrating into South America, and the other (the Camels) crossing Bering Sea into the Old World.

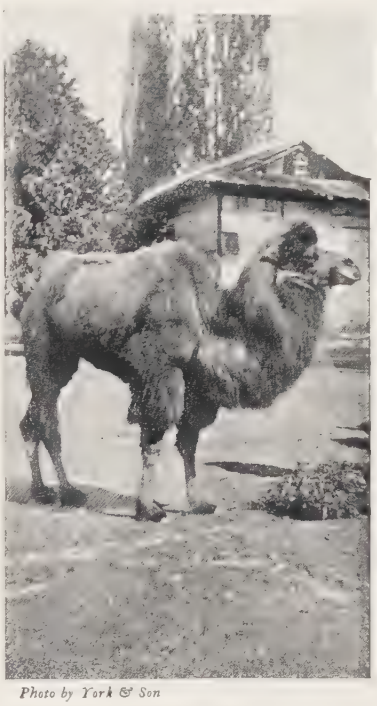


Photo by York & Son

A CAMEL

A half-breed between the Arabian and Bactrian species

The True Camel

Before proceeding further, it may be well to refer to the confusion which exists in the use of the names Camel and Dromedary. The latter name seems popularly to be applied to the two-humped species, the name Camel being reserved for the one with a single hump. This is a mistake. The DROMEDARY is a swift breed of riding-camel of the one-humped species, and is so called to distinguish it from its slower brother, the Pack-camel, or

A STRING OF CAMELS NEAR PORT SAID

These are the typical desert camels of the East

Baggage-camel. The pack-camel, it is interesting to note, has been introduced into Australia, where it has proved invaluable in crossing the vast waterless deserts, on account of its power to exist for long periods without drinking.

The TRUE or ARABIAN CAMEL is found in a domesticated state in Africa and Asia, and, as we have just indicated, belongs to the one-humped species. It is a long-limbed, short-haired animal, standing as much as 7 feet high. As a wild animal it is extinct. Much mystery, indeed, surrounds the question of its origin. It has been suggested that the Arabian camel, or its immediate parent, may have sprung from an Indian ancestor, and thence made its way through Arabia and Syria into Northern Africa.

HEAD OF BACTRIAN CAMEL

The hair of this species is used to felt into material for tents. It is longest on the top of the head, neck, humps, and parts of the fore limbs

Not only is the camel indispensable as a beast of burden, but it is esteemed also for its hair, its flesh, bones, and milk. The hair is woven into cloth. In some parts of India the bones are used instead of ivory for inlaid work. The milk is unusually thick and rich, so much so that it cannot be used for tea or coffee, as it curdles when mixed with either.

The camel is popularly supposed to be a very docile animal; but those who speak from experience declare it to be stupid, surly, and vicious to the last degree. It is, however, not entirely void of understanding, and apparently cherishes feelings of revenge, as the following story shows: "A camel, working in an oil-mill, was severely beaten by its driver. Perceiving that the camel had treasured up the injury, and was only waiting a favourable opportunity for revenge, he kept a strict watch upon the animal. Time passed away; the camel, perceiving it was watched, was quiet and obedient, and the driver began to think the beating was forgotten, when one night, after the lapse of several months, the man was sleeping on a raised platform in the mill, whilst the camel, as is customary, was stabled in a corner. Happening to awake, the driver observed by the bright moonlight that, when all was quiet, the animal looked cautiously round, rose softly, and, stealing towards a spot where a bundle of clothes and a bernous, thrown carelessly on the ground, resembled a sleeping figure, cast itself with violence upon them, rolling with all its weight, and tearing them most viciously with its teeth. Satisfied that revenge was complete, the camel was returning to its corner, when the driver sat up and spoke. At the sound of his voice, perceiving the mistake it had made, the animal was so mortified at the failure and discovery of its scheme, that it dashed its head against the wall and died on the spot."

It is said that when camels pass a mounted man in a narrow path they will turn their heads suddenly round and endeavour to inflict a bite on the rider's arm or shoulder. This is naturally much dreaded, as a camel's bite is particularly severe.

Much care has been spent in the breeding of the camel. "In the Sahara Desert," says Canon Tristram, "the Tourareg is as careful in the selection of his breeding mahari (a fine race of the dromedary) as the Arab is in that of his horse. The pedigrees are handed down, and many a dromedary can boast a genealogy far longer than the descendants of the Darley Arabian" (page 202).

THE BACTRIAN CAMEL

This species is often called the Dromedary; but, as we have already remarked, this is an error. The dromedary is a swift breed of the Arabian camel. The BACTRIAN CAMEL may be

AN OLD MALE BACTRIAN CAMEL

This animal is a magnificent representative of the two-humped species, so widely distributed in Central Asia

Photo by Charles Knight [*Aldershot*

BACTRIAN CAMEL

The most useful transport animal of Central Asia

THE LLAMAS

THE LLAMAS are humpless camels, and confined to the western and southernmost parts of South America. Two wild and two domesticated species are known. The name Llama, it should be mentioned, properly belongs to the domesticated animal of that name.

THE VICUÑA

This is the smaller of the two wild species. Vicuñas live in herds in the mountain-ranges of Peru, dwelling during the wet season high up amid rocks and precipices, near the region of perpetual snow. In the dry season they descend to the higher valleys. Their capture is a matter of great difficulty; for, apart from the inaccessible nature of their haunts, they are exceedingly shy and vigilant. They are clothed in a woolly coat of extremely delicate texture, much in demand for weaving purposes.

The baby vicuña, it is interesting to note, is able to run swiftly directly after its birth, and possesses great powers of distinguished from its Arabian relative by the fact that it has two humps, is shorter in the leg and heavier, and has longer hair and stouter and harder feet. The shorter legs are distinctly advantageous, enabling the animal to get about with ease and safety over rocky and hilly ground.

The hordes of wild camels found in Turkestan, in the neighbourhood of Kashgar, are believed by Major C. S. Cumberland to be descended from camels which escaped when the district known as Takla Makan was buried in a great sand-storm 200 years ago. From the fury of that storm it is said no human being escaped alive. Some camels apparently did, perhaps owing their survival to the power they possess of closing the nostrils, and thereby keeping out the sand.

The Bactrian camel lives upon the salt and bitter plants of the steppes, which are rejected by almost all other animals. It is further able to drink brackish water from the salt lakes by which it is surrounded. When pressed by hunger, it will even eat felt blankets, bones and skins of other animals, and fish!

YOUNG BACTRIAN CAMEL

The two humps are just beginning to grow

endurance. This is the more noteworthy since the young of the camel are exceedingly helpless.

Vicuñas are hunted by the Indians and captured by driving them into an enclosure of perhaps half a mile in diameter. This is hung round with bits of coloured rag, which, fluttering in the wind, appear to deter the captives from breaking through.

The Guanaco

This is larger than the vicuña, and is described as an elegant animal, being possessed of a long, slender, gracefully curved neck and fine legs. It ranges from the highlands of the Andes to the plains of Patagonia and the islands of Tierra del Fuego. As Mr. Darwin points out, the behaviour of guanaco when alarmed is very contradictory. At one time they will sound the danger-signal, and put themselves out of harm's way long before the enemy has perceived them; at another they exhibit the most extraordinary curiosity, and pay the death-penalty in consequence. "That they are curious is certain; for if a person lies on the ground and plays strange antics, such as throwing up his feet in the air, they will almost always approach by degrees to reconnoitre him. It was an artifice that was repeatedly practised by our sportsmen with success, and it had, moreover, the advantage of allowing several shots to be fired, which were all taken as part of the performance. On the mountains of Tierra del Fuego, I have more than once seen a guanaco, on being approached, not only neigh and squeal, but prance and leap about in the most ridiculous manner, apparently in defiance, as a challenge. These animals are very easily domesticated, and I have seen some thus kept in Northern Patagonia near a house, though not under any restraint. They are in this state very bold, and readily attack a man by striking him from behind with both knees. The wild guanacos, however, have no idea of defence; even a single dog will secure one of these large animals till the huntsmen can come up. In many of their habits they are like sheep in a flock. Thus, when they see men approaching in several directions on horseback, they soon become bewildered, and know not which way to run. This greatly facilitates the Indian method of hunting, for they are thus easily driven to a central point, and are encompassed."

Photo by J. W. McLellan

GUANACO

The wild original of the llama and alpaca

Guanacos readily take to the water, and have been frequently seen swimming from one island to another. Here again the llamas differ from the camels, for these can swim but little, if at all. Like the Bactrian camel, the guanaco can drink salt water with impunity.

One of the most remarkable traits of the guanaco is that which induces it, when it feels its end to be near, to seek out the dying-place of the tribe, and there breathe out its last. "The guanacos," says Mr. Darwin, "appear to have favourite spots for lying down to die. On the banks of the St. Cruz, in certain circumscribed places, which were generally bushy and all near the river, the ground was actually white with bones. On one such spot I counted

between ten and twenty heads. . . . The animals in most cases must have crawled, before dying, beneath and amongst the bushes."

The Llama

This is the first of the two domesticated offshoots of the guanaco, the other being the Alpaca. The Llama is a larger beast than the guanaco, and variable in colour. The ancient Peruvians bred it as a beast of burden or for riding, and before the Spanish conquest kept it in enormous numbers. Soon after the Spanish conquest "it was not uncommon to meet droves of from 300 to 500, or even 1,000 llamas, each laden with silver ingots, and the whole in charge of a single native. . . . Only the male llamas were used as beasts of burden, while the smaller females were kept for their milk and flesh. In traveling along the roads, the droves marched in single file, under the guidance of a leader; and such a line would traverse the highest passes of the Cordillera, and skirt the most stupendous precipices with perfect safety. . . . The Spanish conquerors of Peru spoke of llama-flesh as being fully equal to the best mutton, and they established shops in the towns for its regular sale. At the time of the conquest it is estimated that upwards of 300,000 llamas were employed in the transport of the product of the mines of Potosi alone."

The Alpaca

This animal is bred solely for the sake of its wool, which is of great length and fineness. From it is made the well-known fabric which bears, in consequence, the name "alpaca."

The alpaca is kept in herds on the high grounds of Bolivia and South Peru, whence it is annually driven down to be sheared. The Incas dyed the wool — which is of two qualities, a fine and a coarse — with bright colours, and made it up into cloth or blankets, as the occasion served.

The earliest account of this animal is by Augustin de Zarate, the Treasurer-General of Peru in 1544. He speaks of the beast as a sheep; but since he describes it as camel-like in shape, though devoid of a hump, there can be no doubt that it is the llama he is describing.

LLAMAS

Largely used as beasts of burden in Peru, where these and the alpaca were formerly the only domesticated ruminants

He says: "In places where there is no snow the natives want water, and to supply this they fill the skins of sheep with water, and make other living sheep carry them; for, it must be remarked, these sheep of Peru are large enough to serve as beasts of burden. They can carry about 100 lbs. or more, and the Spaniards used to ride them, and they would go four or five leagues a day. When they are weary, they lie down on the ground; and as there are no means of making them get up, either by beating or assisting them, the load must of necessity be taken off. When there is a man on one of them, if the beast be tired and urged to go on, he turns his head round and discharges his saliva, which has an unpleasant odour, into the rider's face. These animals are of great use and profit to their masters, for their wool is very good and fine . . . and the expense of their food is trifling, as a handful of maize suffices them, and they can go four or five days without water. Their flesh is as good as that of the fat sheep of Castile. There are now public shambles for the sale of their flesh in all parts of Peru, which was not the case when the Spaniards came first."

Photo by Miss E. J. Beck

LLAMA

The larger of the two domesticated forms descended from the guanaco

The particularly offensive habit of spitting in the face of people who may be obnoxious to it is well known to those who are in the habit of seeing much of this animal.

ALPACA

A domesticated form, bred solely for its wool, which is of a dark brown or black colour

THE CHEVROTAINS

MENTION must be made, before passing to the Pig Tribe, of the smallest of hoofed mammals, the Royal Antelope excepted—the CHEVROTAINS. These little animals are hornless, and intermediate in character between the Deer, Camels, and Pigs. The males have large canine teeth, like those of the Musk-deer, with which the Chevrotains have long been confounded. The range of these animals, of which there are five species known, extends from India and Ceylon, through the Malayan countries, as far east as the island of Palawan, in the Philippine group. One species, the largest of the group, occurs on the west coast of Africa.

CHAPTER XIX

THE PIG AND HIPPOPOTAMUS

THE PIG TRIBE

BY H. A. BRYDEN

MANY species and varieties of swine are found in different parts of the world, most of them exhibiting strong traces of a general family resemblance, although widely sundered as to habitats and often markedly differing in outward appearance. All are omnivorous; all have the stomach simpler in type than in the Ruminants; and all have front or incisor teeth in the upper jaw. The two great families of swine proper are the Pigs and Peccaries.

There has been much discussion among scientists as to the early origin of the various breeds of domestic swine found in different parts of the world. There can be little doubt that, although selective breeding has produced extraordinary differences in outward appearance, even among the domestic pigs of our own islands, the origin of the numerous tame races is to be sought in the ancestry of the wild breeds of the countries in which they are found. Darwin has some very apposite remarks on the differences to be observed in domesticated swine. "The peculiar form of the skull and body in the most highly cultivated races is," he observes, "not characteristic of any one race, but is common to all when improved up to

Photo by W. Reid

A DOMESTICATED SOW AND HER PROGENY

The absence of stripes and spots on the young is a feature in which they differ from those of nearly all wild swine

Photo by Ottomar Anschütz] [Berlin

WILD BOAR

In its long, bristly hair and powerful lower tusks, the wild boar is a very different animal from its domesticated descendants

the same standard. Thus the large-bodied, long-eared English breed, with a convex back, and the small-bodied, short-eared Chinese breeds, with a concave back, when bred to the same state of perfection, nearly resemble each other in the form of the head and body. This result, it appears, is partly due to similar causes of change acting on the several races, and partly to man breeding the pig for one sole purpose — namely, for the greatest amount of flesh and fat; so that selection has always tended towards one and the same end. With most domestic animals the result of selection has been divergence of character; here it has been convergence."

The True Pigs

True pigs are found only in the Old World, and even there in very widely different forms. Typical of these quadrupeds is the well-known Wild Boar, found abundantly in many parts of Europe, North Africa, Asia Minor, and Central Asia. In the British Islands the wild boar must once have been extraordinarily plentiful, especially in Ireland, where its tame descendants still so greatly flourish. In the days of the Plantagenets wild swine fed and sheltered in the woodlands close to London. James I. hunted them near Windsor in 1617, and even down to the year 1683 these animals still had their haunts in the more secluded parts of England. Although now extinct in these Islands, the wild boar is to be found plentifully at the present day in France, Germany, Austria, Russia, and Spain, Greece, Albania, and other countries of the Mediterranean. In most parts of Europe the wild boar is shot during forest drives, but in the Caucasus and round the Black Sea the hardy peasants lie in wait for these animals by the fruit-trees on autumn nights or waylay them going to the water and shoot them single-handed. Many an old Cossack, writes Mr. Clive Phillipps-Wolley, bears the scars of some desperate encounter with these formidable foes. In Spain, where in the old days the boar was pursued by cavaliers with spear and pike, it is still, in the forests of Estremadura, followed with horse and hound, usually, says Mr. Abel Chapman, "during the stillness of a moonlight night, when the acorns are falling from the oaks in the magnificent Estremenian woods."

Photo by J. Turner-Turner, Esq.

DIVING-PIGS

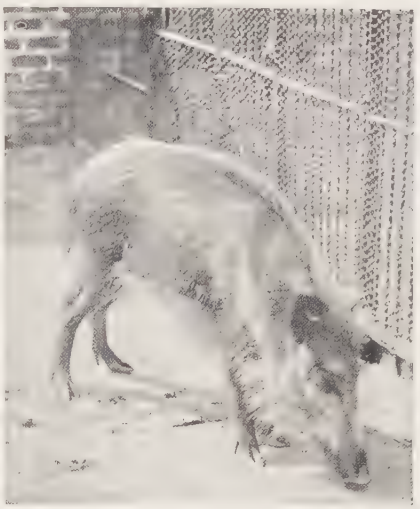
Half-wild pigs, found in Florida, where they live on refuse fish. (*See next page*)

In India the wild boar of Europe and North Africa is replaced by a closely allied species (distinguished by a crest of long black bristles upon the neck and back), which furnishes some of the finest and most exciting sport in the world to mounted hunters armed with a sharp spear. There is not a pluckier or more fearless beast living than the boar; and as he carries long and extremely sharp tusks, and never scruples to use them, he is an exceedingly dangerous opponent when wounded and enraged. Severe and even fatal accidents have happened in the pursuit of this determined beast of chase. When at bay, the boar is absolutely reckless of life; and although pierced and mortally wounded by the spear, will yet force himself up the shaft, and with his dying effort inflict gaping wounds on the horse bearing his attacker. Indian shikaris, to illustrate the courage of the wild boar, say that he has the hardihood to drink at a river between two tigers; and Colonel R. Heber Percy mentions, in the Badminton volumes on "Big Game Shooting," that "several cases are on record in which an old boar has beaten off a tiger, and some in which the latter has been killed by a boar. The boar's extraordinary activity and sharp tusks make him no mean adversary, and his short neck makes it difficult for a tiger to seize it and give it that fatal wrench with which he likes to polish off his victims." A wild boar will stand as much as 3 feet at the shoulder — some sportsmen affirm considerably more — and weigh more than 300 lbs. The finest boar's tusk known is one mentioned in Rowland Ward's "Records of Big Game." This measures $11\frac{1}{2}$ inches over the curve. It came from the Caucasus, and is in the possession of Colonel Veernhof.

It is worthy of note that, while the full-grown individuals of the various species of wild swine are uniformly coloured, their young are longitudinally striped and spotted. In India, besides the common boar, a tiny wild swine, known as the PYGMY HOG, is found in the Bhutan Terai and the forests of Nepal and Sikhim. This pig, which is little bigger than a fox-terrier, runs in considerable troops, or sounders, and is said to attack intruders into its domain much in the same fearless way in which the peccary of America defends its sanctuaries. The height of this diminutive species is given as from 8 to 10 inches — the weight at 10 lbs.

Wild swine are nocturnal in their habits, frequenting moist and marshy country, loving the shade of forests, and making their lairs in tall grass, reed-beds, and similar covert. They go far afield for their food-supplies, and do a great deal of damage to crops in cultivated districts. The European wild sow produces from six to ten young, and at least two litters are usually brought forth in the year.

It is remarkable how quickly pigs, as well as other domesticated animals, revert to a semi-feral state of existence, and develop habits suited to a fresh environment. Mr. J. Turner-Turner sends us the following interesting note in connection with this trait: "DIVING-PIGS.—These pigs live in an almost wild condition on certain of the islands off Florida, and subsist chiefly upon the refuse fish cast away by the netsmen. To obtain this, the pigs dive under water, walking on the land at a depth of 5 feet below the surface."



JAVAN WILD PIG

One of several nearly allied species inhabiting the Malay Islands

Among other Asiatic wild swine are to be mentioned the COLLARED PIG, found in Java, Sumatra, and Borneo; the WHITE-WHISKERED JAPANESE PIG; the PAPUAN and FORMOSAN PIGS; the WARTY PIG of Java and Borneo; the CERAM PIG; the CELEBES PIG; and the BEARDED PIG of Borneo, a species distinguished by a quantity of long hair carried upon the cheeks. In the Andaman Islands a small, shaggy wild pig, standing about 20 inches at the shoulder, is found in the forests. Although distinguished from the well-known wild boar of India by certain peculiarities, there is a strong family resemblance to that well-known species in most of these various Asiatic species and races.

Among the many kinds of domesticated swine found in Asia, perhaps the strangest and most curious is the JAPANESE MASKED PIG. This animal is described by Darwin as having "an extraordinary appearance, from its short head, broad forehead and nose, great fleshy ears, and deeply furrowed skin. Not only is the face furrowed, but thick folds of skin, which are harder than the other parts, almost like the plates on the Indian rhinoceros, hang about the shoulders and rump. It is coloured black, with white feet, and breeds true. That it has long been domesticated there can be little doubt; and this might have been inferred even from the circumstance that its young are not longitudinally striped."

MALE AND FEMALE BABIRUSA

The chief characteristic of this pig is the peculiar and enormous development of the tusks in the male, the upper pair of which grow through the lips and curve backwards

In Africa, besides the European wild boar, which there extends its range to Algeria and Morocco, a little-known wild pig is the SENAAR BOAR, found in Senaar, Kordofan, and the Soudan region. In the late Dr. Gray's "Catalogue of Carnivora" this wild pig is described as having the fur dense and bristly, and

WART-HOG

Shows the great size of the head in proportion to the body

being in colour dull olive-black, varied with yellow. Possibly this little-known swine may prove to be merely a sub-species of the common wild boar of Europe and North Africa. Now that the Soudan regions have once more been opened up to Europeans, we may expect shortly to hear more of this wild swine, as well as of other rare and interesting animals.

Still dealing with the true pigs, we come now to the BUSH-PIGS of Africa and Madagascar. These differ somewhat from the typical wild boars of Europe and India in the structure of the teeth, the long pencilled ear-tufts, the elongated snout, and other characteristics. The tusks are considerably smaller, and seldom exceed 6 or 7 inches in length. The RED RIVER-HOG, or WEST AFRICAN BUSH-PIG, is decidedly the most striking of this group. Smaller than the bush-pig of South Africa, and seldom exceeding 2 feet in height at the shoulder, the colour of this animal is a brilliant reddish brown, with tints of yellow. Noticeable streaks of white are found round the eyes and on the cheeks. The ear-tufts, forehead, and limbs are blackish; more white markings are seen at the tips of the ear-tufts, along the thick mane, and round the margins of the ears. The under-parts are whitish grey in colour. This very handsome pig runs in considerable herds, and is found chiefly in forest and jungle near the banks of the various rivers in West Africa. Its range extends from Angola to Senegambia, and eastwards into the continent as far as Monbuttu.

The well-known BUSH-PIG OF SOUTH AFRICA, the BOSCH-VARK of the Boers, is a fine species, having a wide range over much of the southern and south-eastern parts of the continent, extending as far north as Central Africa. In the Eastern Transvaal and Swaziland these animals attain their greatest size, an adult boar standing from 2 feet 4 inches to 2 feet 7 inches in height, and weighing as much as from 150 to 170 lbs. The usual colour is brownish red, the face and mane greyish; but in different specimens and at different ages great variations are to be noticed. Pale greyish brown or mottled brown are colours often to be found. These bush-pigs are formidable-looking creatures, with thick bristling manes, small deep-set eyes, and sharp if somewhat short tusks, which they know well how to use. Among the old fashioned Boers cured hams from these animals were, when they were more plentiful in Cape Colony, often to be found in up-country farmhouses. The bosch-vark is a beast of shy, nocturnal habit, and, loving as it does the shade and protection of dense covert and bush, is, unless carefully sought for, not often seen by sportsmen. The herds range usually from half a dozen to as many as twenty in number. When once encountered and set up at bay, this wild swine

Photo by Scholastic Photo. Co.

ÆLIAN'S WART-HOG

Displays the broad muzzle and huge tusks, which are nearly as large in the sows as in the boars

will be found a most tough and courageous adversary, capable and willing to defend itself stoutly against all foes. "They are," says Mr. F. Vaughan Kirby, who has had much experience in hunting these animals, "expert swimmers and swift of foot, and can get over the roughest ground at a great pace. There is no pluckier beast in Africa than a bush-pig, and even a leopard will hesitate before attacking a full-grown boar. Like all wild creatures, they have an instinctive dread of man, and will always make their escape from him if possible; but if surrounded or wounded and brought to bay, they appear to accept the situation with stolid imperturbability, and die fighting with rare pluck, against all odds, grim and silent to the last. . . . Face to face in the middle of a 'fast' bush, and only a Swazi 'stabbing-assegai' with which to kill him, . . . I have seen an old boar, after receiving nine thrusts from those terrible weapons, two of which were still fast in him, make a charge that scattered us like chaff, and in three consecutive lunges lame one of our number for life, and disembowel two of the finest 'pig-dogs' I ever hunted with. In such encounters a boar inflicts terrible wounds with his teeth, as well as with his tusks." Few men care to face a wart-hog on foot.

Another bush-pig is found in Madagascar, and is known as EDWARDS' BUSH-PIG. Its habits are very similar to those of its brethren in the neighbouring continent of Africa.

HEAD OF MALE WART-HOG

Profile showing the large conical warty growths on the side of the face so characteristic of these animals

THE BABIRUSA

Quitting the true pigs, we come now to perhaps the very strangest and most singular of all the great tribe of swine. This is the BABIRUSA, that curious and grotesque creature found in the island of Celebes, in the Malay Archipelago. The name Babirusa signifies "pig-deer." It is of course a misnomer, and the animal has no kinship whatever with the cervine race. The babirusa is a wild swine, having a dark slate-grey skin, very sparsely covered with hair along the ridge of the spine. This skin is very extraordinarily wrinkled. The ears are much smaller than is the case with other members of the swine group, while the tail is short, straight, and lacks any semblance of tuft. The females have small tusks. In the boars the tusks are most singularly and abnormally developed. From the upper jaw, instead of curving from the side of the lips, the tusks grow from the centre of the muzzle, penetrate right through the skin, and curve backwards often till they touch the forehead. The lower tusks have also a strong curve, but are not so long as those of the upper jaw Although thus superabundantly provided with tushes, the babirusa is, as regards the rest of its teeth, less well off, having only thirty-four, as against the forty-four of the European wild boar. In their habits these singular pigs much resemble other wild swine, going in herds and frequenting forest, jungle, and the banks of rivers. They are excellent swimmers. The young are, unlike other wild swine in the infant state, unstriped. These animals are often found domesticated about the dwellings of native chiefs in Celebes. The weight of a good male is as much as 128 lbs.; height at shoulder, 27½ inches. The longest tusk recorded measures 17 inches

Photo by W. P. Lando

COLLARED PECCARY

Peccaries are the American representatives of the Swine, and are characterised by a large gland on the back

over the curve. These animals are driven into nets and speared by the natives of Celebes, and afford excellent sport, the boars especially charging viciously at their assailants.

THE WART-HOGS

If the babirusa of the Malay Archipelago is a sufficiently bizarre-looking creature, the wart-hog of Africa yields to none of the wild pigs in sheer, downright hideousness of aspect. The WART-HOG OF SOUTH AFRICA, the VLAKTE-VARK (Pig of the Plains) of the Boers, has long been familiar to hunters and naturalists. Standing some 30 inches in height, this wild swine is distinguished by the disproportionate size of the head, extreme length, breadth, and flatness of the front of the face and muzzle, smallish ears, huge tusks, and the strange wart-like protuberances from which it takes its name. Three of these wen-like growths are found on each side of the face. The tusks of the upper jaw, unlike the teeth of the true pigs, are much larger than those protruding from the lower jaw. The lower tusks seldom exceed 6 inches in length; those of the upper jaw occasionally reach as much as 20 inches over the curve. A pair from North-east Africa (Annesley Bay, on the Abyssinian littoral) measure respectively 27 and 26 inches — truly gigantic trophies. The skin of this wild hog is nearly naked, except upon the neck and back, where a long, coarse mane of dark bristly hair is to be observed. Wart-hogs, as their Dutch name implies, in the days when game was plentiful, were often found in open country, on the broad grass-plains and karroos. At the present day they are less often seen in the open. They run in small family parties, usually two or three sows and their litters. The old boars, throughout a great part of the year, prefer a more solitary existence. These animals, when pursued, usually betake themselves to an open earth, not of their own making, and, slewing round sharply just as they enter, make their way in hind end first. They afford no great sport to the hunter, and are usually secured with a rifle-bullet. The flesh is fairly good eating, especially that of a young and tender specimen. Speaking generally, wart-hogs are nothing like such fierce and determined opponents as the wild boars of Europe and India, or even the bush-pig. They will, however, charge occasionally, and have been known to attack and rip up a horse. A northern species — ÆLIAN'S WART-HOG — is found in Abyssinia, Somaliland, and other parts of East Africa, where — especially in Abyssinia — it roams the mountains and their vicinity, occasionally to a height of 9,000 or 10,000 feet. There is little difference between this and the southern form. Wart-hogs produce usually three or four young, and the sow makes her litter in a disused burrow. Unlike those of the majority of wild swine, the young of the wart-hog are uniformly coloured, having no white stripes or spots.

The Peccaries

Peculiar to the American Continent, the PECCARIES differ considerably from the wild swine of the Old World. They are of small size; the dentition is not the same, the stomach is more complicated in structure, and the hind feet have three instead of four toes. In general appearance peccaries are not unlike small dark-coloured pigs, well covered with bristles, and having, as well as a prominent mane, a deep fringe of hair beneath the throat. They are essentially forest-loving animals, roaming over large tracts of country and making considerable migrations in search of food. Two species have been distinctly identified by naturalists — the COLLARED PECCARY, and the WHITE-LIPPED PECCARY. Of these, the former species is found from Texas, in North America, as far south as the Rio Negro, in Patagonia. The habitat of the white-lipped peccary is more circumscribed, and the animal is seldom found except in that part of South and Central America lying between British Honduras and Paraguay. No members of the Pig Family are fiercer or more tenacious of their sanctuaries than the white-lipped peccary, which roams the dense forests of Brazil and Paraguay in large herds. A human being, attacked and surrounded by a herd of these savage little creatures, would indeed stand but a poor chance of his life, and many a hunter and traveler has been compelled to seek refuge in a tree and sustain some hours of siege. Of the two species, the white-lipped peccary is somewhat the larger, standing from 15 to 17½ inches in height. The collared peccary averages from 13½ to 15½ inches. The flesh of these wild swine is not in much repute, and unless the back-gland is at once cut out a freshly killed specimen will become quickly spoiled as a human food-supply. Young peccaries appear to be easily tamed, fierce as is their nature in the wild state. In contrast with the abundant litters of other pigs, wild and domesticated, only one offspring is ordinarily produced at birth. In fighting, the peccary does not rip like the wild boar, but inflicts savage and severe bites.

"Untrained dogs," says President Roosevelt, "even those of a large size, will speedily be killed by a single peccary, and if they venture to attack a herd will be literally torn into shreds. A big trained dog, however, can, single-handed, kill a peccary, and I have known the feat performed several times."

Azara, the eminent Spanish naturalist of the end of the eighteenth century, had considerable experience of the peccaries of Central and Southern America, where the Indians are much addicted to taming wild animals, and keep both the peccary and the tapir in a state of semi-domestication. The peccary he found to be domesticated more easily than might be expected. Though so fierce in its wild state, it soon becomes troublesome from its familiarity.

Mr. Schomburgk, the explorer of Central America, whose travels were so constantly quoted during the Venezuelan arbitration, saw much of the white-lipped species in the forests. He found the animals in large troops under the leadership of an old boar. When attacked, they were ready to surround man, dog, or jaguar; and if there were no means of escape, the enemy was certain to be cut to pieces. He himself had a narrow escape from an infuriated herd, the leader of which he shot in the act of rushing at him. As the herd approached the sound was like that of a whirlwind through the bushes.

Photo by Schwartz Photo. Co.

A YOUNG COLLARED PECCARY

In this specimen the white collar from which the species takes its name is very clearly displayed

By permission of Herr Carl Hagenbeck, Hamburg

A THREE-YEAR-OLD HIPPOPOTAMUS

In this specimen the great lower tusks are not yet developed

THE HIPPOPOTAMUS

BY F. C. SELOUS

Two species of the Hippopotamus Family exist on the earth to-day, both of which are inhabitants of Africa, and are not found in any other country; but the remains of many extinct forms of this genus which have been discovered in various parts of Europe and Asia show that in Pleistocene and Pliocene times these strange and uncouth animals must have been widely distributed throughout the greater part of the Old World. The fossil remains of the large form of hippopotamus which once frequented the lakes and rivers of England and Western Europe cannot be distinguished from the bones of the common African species of to-day, which latter is possibly the only animal in the world which has undergone no change in form or structure since the prehistoric savages of the Thames Valley threw stone-headed spears at their enemies.

The Common Hippopotamus, though it has long been banished from the Lower Nile, and has more recently been practically exterminated in the British colonies south of the Limpopo, was once an inhabitant of every lake and river throughout the entire African Continent from the delta of the Nile to the neighbourhood of Cape Town. Now it is not found below Khartum, on the Nile; but in Southern Africa a few hippopotamuses are said still to exist in the lower reaches of the Orange River. When Van Riebeck first landed at the Cape, in 1652, he found some of these animals in the swamp now occupied by Church Square, in the centre of Cape Town, and the last in the district was only killed in the Berg River, about seventy miles north of that city, as recently as 1874. This animal, which had been protected for some years, was at last shot, as it had become very savage, and was in the habit of attacking any one who approached it. In my own experience I have met with the hippopotamus in all the large rivers of Africa where I have travelled, such as the Zambesi, Kafukwe, Chobi, Sabi, Limpopo, and Usutu, and also in most of the many large streams which take their rise on the plateau of Matabililand and Mashonaland, and flow north, south, and east into the Zambesi, the Limpopo, or the Sabi. I have also seen them in the sea, at the mouth of the Quillimani River, and have heard from natives that they will travel by sea from the mouth of one river to another.

Hippopotamuses live either in families of a few individuals or in herds that may number from twenty to thirty members. Old bulls are often met with alone, and cows when about to calve will sometimes leave their companions and live for a time in seclusion, returning, however, to the herd soon after the birth of their calves. Although, owing to the shortness of its legs, a hippopotamus bull does not stand very high at the shoulder — about 4 feet 8 inches being the average height — yet its body is of enormous bulk. A male which died some years ago in the Zoological Gardens of London measured 12 feet in length from the nose to the root of the tail, and weighed 4 tons; and these dimensions are probably often exceeded in a wild state.

The huge mouth of the hippopotamus (see Coloured Plate), which the animal is fond of opening to its widest extent, is furnished with very large canine and incisor teeth, which are kept sharp by constantly grinding one against another, and thus enable their possessor

Photo by J. W. McLellan

HIPPOPOTAMUS DRINKING

The enormous breadth of the muzzle, as well as the small nostrils, which can be closed at will, are clearly displayed in this posture

to rapidly cut down great quantities of the coarse grass and reeds upon which these animals exclusively feed when living in uninhabited countries. When, however, their haunts are in the neighbourhood of native villages, they often commit great havoc in the corn-fields of the inhabitants, trampling down as much as they eat; and it was their fondness for sugar cane which brought about the destruction of the last herd of hippopotamuses surviving in Natal.

The lower canine teeth or tusks of the hippopotamus grow to a great size, and in bulls may weigh from 4 lbs. to 7 lbs. each. They are curved in shape, and when extracted from the jaw form a complete half-circle, and have been known to measure upwards of 30 inches over the curve. In life, however, not more than a third of their length protrudes beyond the gums.

During the daytime hippopotamuses are seldom met with out of the water. They lie and doze all day long in the deep pools of the rivers they frequent, with only their eyes, ears, and nostrils above the surface, or else bask in the sun on the tail of a sandbank, looking like so many gigantic pigs with their bodies only partially submerged. Sometimes they will lie and sleep entirely out of water amongst reeds. I have seen them feeding in the reed-beds of the great swamps of the Chobi just at sundown, but as a rule they do not leave the water until after dark. At night they often wander far afield, especially in the rainy season, in search of suitable food; and after having been fired at and frightened, I have known a herd of hippopotamuses to travel at least five-and-twenty miles along the course of a river during the ensuing night, in order to reach a larger and deeper pool than the one in which they had been molested.

HIPPOPOTAMUSES BATHING

A hippopotamus stays under water for about 2½ minutes at a time, and then just shows part of its head above water while it draws a fresh breath

Although the hippopotamus is thoroughly at home in the hottest parts of Africa, and appears to thrive in the tepid waters of all the rivers which flow through the malarious coast regions of the tropical portions of that continent, it is also found at a considerable altitude above the sea, and in quite small streams where the temperature of the water during the winter months cannot be many degrees above freezing-point. I have personally met with hippopotamuses in the Manyami River, not far from the present town of Salisbury, in Mashonaland. The country there has an altitude of about 5,000 feet above sea-level; and the water was so cold on the last occasion on which I came across the animals in question — July, 1887 — that, if a basinful was left out during the night, ice quite an eighth of an inch in thickness would be formed over it before morning. There was, however, never any ice on the river itself. During the rainy season, when the grass and reeds are green and succulent, hippopotamuses become enormously fat, especially in the higher and colder portions of their range, and retain a good deal of their fat right through the driest season of the year. Old bulls are usually very lean; but I have seen cows the greater part of whose carcasses, after the skin had been stripped off, was covered with a layer of fat from 1 inch to 2 inches in thickness. The meat of these animals is dark red in colour, and more like beef than pork. To my mind, that of a young animal is most excellent in flavour, and far preferable to that of a lean antelope. The fat, when prepared, is as good as the best lard, from which, indeed, it is hardly distinguishable. The skin of the

By permission of Herr Carl Hagenbeck] [*Hamburg*

BABY HIPPOPOTAMUS, AGED SIX MONTHS

The flesh of a young hippopotamus is said to have an excellent flavour. Natives often follow shooting expeditions in order to secure some of its meat

hippopotamus is smooth and hairless, and in adult animals quite 1½ inch in thickness on the upper parts of the body.

Hippopotamuses are said to be capable of remaining under water for ten or twelve minutes. Should, however, a herd of these animals be watched but not fired at from the bank of a river in which they are passing the day, they will all sink below the surface of the water as soon as they become aware of and more or less alarmed by the presence of the intruder, but each member of the herd will come up to breathe at intervals of from one to two minutes. I have seen hippopotamuses so tame and unsuspicious of danger that they allowed me — the first human being probably with any kind of hat or clothes on him that they had ever seen — to take up a position within fifty yards of them on the edge of the deep rock-bound pool in which they were resting without showing any signs of alarm. They simply stared at me in an inquisitive sort of way, raising their heads higher out of the water, and constantly twitching their little rounded ears; and it was not until a number of natives came up and began to talk loudly that they took alarm, and, sinking out of sight, retreated to the farther end of the pool. I once took the length of time with my watch for more than an hour that a hippopotamus which I was trying to shoot remained under water. This animal, a cow with a new-born calf, had made an attack upon one of my canoes. It first came up under the canoe, tilting one end of it into the air and almost filling it with water. Then it made a rush at the half-swamped craft, and, laying its huge head over it, pressed it down under the water and sank it. There were four natives in the canoe at the time of the attack, all of whom swam safely to an island in the river — the Zambesi. After the accident — which caused me a good deal of loss and inconvenience — I tried to shoot this unprovoked aggressor, but unsuccessfully, as the river was too broad to allow me to get anything but a long shot at her. The shortest time she remained under water during the seventy minutes I was paying attention

to her was forty seconds, and the longest four minutes and twenty seconds — the usual time being from two to two and a half minutes. She always remained a long time under water after having been fired at.

The capsizing of canoes by these animals is quite a common occurrence on most African rivers, and the great pains the natives will take in certain districts to give these animals a wide berth seem to prove that they have good reason to dread them. Solitary bulls and cows with young calves are the most feared. Such animals will sometimes, I have been assured by the natives, tear out the side of a canoe with their teeth, and even crunch up some of its occupants whilst they are trying to save themselves by swimming. Sipopo, a chief of the Barotse tribe, who was deposed by his nephew Mona Wena in 1876, was said to have been attacked and killed by a hippopotamus whilst lying wounded amongst the reeds on the southern bank of the Zambesi, but I cannot vouch for the truth of the story.

Bull hippopotamuses must be rather quarrelsome, as I have shot several whose hides were deeply scored with wounds, no doubt inflicted by the tusks of their rivals. Once I killed a hippopotamus in a shallow lagoon amongst the swamps of the Chobi, whose enormously thick hide had been literally cut to pieces from head to tail. The entire body of this animal was covered with deep white scores, and we were unable to cut a single sjambok from its skin. We found, on examination, that this poor beast had been wounded by natives, and then in its distress most cruelly set upon by its fellows, and finally expelled from their society. It was in the last stage of emaciation, and a bullet through the brain must have been a welcome relief. On another occasion a hippopotamus bull, which I had wounded in the nose, became so furious that it dived down and attacked one of its fellows which had already been killed and was lying dead at the bottom of the pool. Seizing this latter animal by the hind leg, it brought it to the surface of the water with such a furious rush that not only half the body of the dead animal it had attacked was exposed, but the whole of its own head and shoulders came above the water. A bullet through the brain killed it instantly, and it sank to the bottom of the pool, still holding its companion's hind leg fast in its jaws.

NO. 1

DENTAL OPERATIONS ON A HIPPOPOTAMUS

This and the next two photographs probably constitute the most remarkable series of animal photographs ever seen. No. 1 shows a hippopotamus about to be trapped, preparatory to having its teeth attended to

When a hippopotamus is killed in the water, the carcase sinks to the bottom, and in the cold water of the rivers of Mashonaland will not rise to the surface till six hours after death. In the warmer water of the Lower Zambesi a dead hippopotamus will come up in about half that time. When it rises, the carcase comes up like a submerged cork, with a rush as it were, and then settles down, only a small piece of the side showing above the surface. As decomposition sets in, it becomes more and more swollen, and shows higher and higher above the water. When the body of a dead hippopotamus has been taken by the wind or current to the wrong side of a river, I have often climbed on to it and paddled it with a stout stick right across the river to a spot nearer camp. A dead hippopotamus is not the easiest or the

pleasantest thing to sit on in deep water with crocodiles about, especially in a wind, as it is very much like sitting on a floating barrel, and unless the balance is exactly maintained one is bound to roll off.

Although it is often necessary for an African traveler to shoot one or more of them in order to obtain a supply of meat for his native followers, there is not much sport attached to the killing of these animals. The modern small-bore rifles, with their low trajectory and great penetration, render their destruction very easy when they are encountered in small lakes or narrow rivers, though in larger sheets of water, where they must be approached and shot from rickety canoes, it is by no means a simple matter to kill hippopotamuses, especially after they have grown shy and wary through persecution. As these animals are almost invariably killed by Europeans in the daytime, and are therefore encountered in the water, they are usually shot through the brain as they raise their heads above the surface to breathe. By the natives hippopotamuses are killed in various ways. They are sometimes attacked first with harpoons, to which long lines are attached, with a float at the end to mark the position of the wounded animal, and then followed up in canoes and finally speared to death. Sometimes they are caught in huge pitfalls, or killed by the fall of a spear-head fixed in a heavy block of wood, which is released from its position when a line, attached to the weight and then pegged across a hippopotamus's path a few inches above the ground, is suddenly pulled by the feet of one of these animals striking against it. A friend of mine once had a horse killed under him by a similar trap set for buffaloes. His horse's feet struck the line attached to the heavily weighted spear-head, and down it came, just missing his head and entering his horse's back close behind the saddle. Where the natives have guns — mostly old muzzle-loading weapons of large bore — they often shoot hippopotamuses at close quarters when they are feeding at night. The most destructive native method, however, of killing these monsters with which I am acquainted is one which used to be practised by the natives of Northern Mashonaland—namely, fencing in

NO. II

DENTAL OPERATIONS ON A HIPPOPOTAMUS

This shows the process of filing one of the lower tusks

NO. III

DENTAL OPERATIONS ON A HIPPOPOTAMUS

Sawing off one of the lower tusks

Photo by York & Son] [Notting Hill

FEMALE HIPPOPOTAMUSES

Exhibits a very characteristic attitude of the animal

strengthened, and platforms sometimes built to command naturally weak places, and from these points of vantage the poor animals were speared when in their desperation they tried to leave the pool. Gradually the whole herd would be speared or starved to death.

Once, in August, 1880, I came upon a native tribe engaged in starving to death a herd of hippopotamuses in a pool of the Umniati River, in Northern Mashonaland. When I came on the scene, there were ten hippopotamuses still alive in the pool. Eight of these appeared to be standing on a sandbank in the middle of the river, as more than half their bodies were above the water. They were all huddled up together, their heads resting on each other's bodies. Two others were swimming about, each with a heavily shafted assegai sticking in its back. Besides these ten still living hippopotamuses two dead ones were being cut up on the side of the pool, and many more must already have been a herd of these animals and starving them to death. As there is a very rapid fall in the country through which all the rivers run to the Zambesi from the northern slope of Mashonaland, these streams consist of a series of deep, still pools (called "sea-cow holes" by the old hunters), from a hundred yards to more than a mile in length, connected with one another by shallow, swift-flowing water, often running in several small streams over the bed of the river. A herd of hippopotamuses having been found resting for the day in one of the smaller pools, all the natives in the district, men, women, and children, would collect and build strong fences across the shallows at each end. At night large fires would be kept blazing all round the pool and tom-toms beaten incessantly, in order to prevent the imprisoned animals from escaping. Day after day the fences would be

Photo by York & Son] [Notting Hill

A HIPPOPOTAMUS FAMILY—FATHER, MOTHER, AND YOUNG

Hippopotamuses are very sociable animals, and are often to be met with in large herds

Photo by G. W. Wilson & Co., Ltd.

HIPPOPOTAMUS

The skin of the hippopotamus is often as much as an inch and a half in thickness on the upper parts of the body

killed, as all round the pool festoons of meat were hanging on poles to dry, and a large number of natives had been living for some time on nothing but hippopotamus-meat. Altogether I imagine that a herd of at least twenty animals must have been destroyed. Much as one must regret such a wholesale slaughter, it must be remembered that this great killing was the work of hungry savages, who at any rate utilised every scrap of the meat thus obtained, and much of the skin as well, for food; and such an incident is far less reprehensible — indeed, stands on quite a different plane as regards moral guilt — to the wanton destruction of a large number of hippopotamuses in the Umzingwani River, near Bulawayo, within a few months of the conquest of Matabililand by the Chartered Company's forces in 1893 These animals had been protected for many years by Lo Bengula and his father Umziligazi before him; but no sooner were the Matabili conquered and their country thrown open to white men than certain unscrupulous persons destroyed all but a very few of these half-tame animals, for the sake of the few paltry pieces of money their hides were worth!

Gradually, as the world grows older, more civilised, and, to my thinking, less and less interesting, the range of the hippopotamus, like that of all other large animals, must become more and more circumscribed; but now that all Africa has been parcelled out amongst the white races of Western Europe, if the indiscriminate killing of hippopotamuses by either white men or natives can be controlled, and the constant and cruel custom of firing at the heads of these animals from the decks of river-steamers all over Africa be put a stop to, I believe that this most interesting mammal, owing to the nature of its habitat, and the vast extent of the rivers, swamps, and lakes in which it still exists in considerable numbers, will long outlive all other pachydermatous animals. Hideous, uncouth, and unnecessary as the hippopotamus

Photo by York & Son] [*Notting Hill*

MALE AND FEMALE HIPPOPOTAMUSES

A hippopotamus is almost inseparable from the water; it never goes farther away than possible from a river or lake

may seem when viewed from behind the bars of its den in a zoological garden, it is nevertheless true that, when these animals have been banished from an African river by the progress of civilisation, that river has lost one of its highest charms and greatest ornaments.

The PYGMY or LIBERIAN HIPPOPOTAMUS is confined to Upper Guinea, and, compared with its only existing relative, is a very small animal, not standing more than 2 feet 6 inches in height, and measuring less than 6 feet in length. In weight a full-grown specimen will scale about 400 lbs. But little is known of the habits of this rare animal, specimens of which, I believe, have never been obtained, except by the German naturalists Herrn Büttikofer and Jentink. When alive, the colour of the skin of the pygmy hippopotamus is said to be of a greenish black, changing on the under-parts to yellowish green. The surface of the skin is very shiny. This species, unlike its giant relative, does not congregate in herds, nor pass its days in rivers or lakes, but lives in pairs in marshes or shady forests. It sleeps during the day, and at night wanders over a great extent of country, eating grass, wild fruits, and the young shoots of trees. Its flesh is said to be very succulent and much esteemed by the natives.

A hippopotamus, apparently of the same species as that now found in Africa, formerly inhabited the Thames Valley. Great quantities of fossil remains of another species are also found in the island of Sicily. The bones found in England are mainly in the river gravel and brick earth of the south and midland districts of England. This seems to show that at the time when the animal existed our rivers must have been open all the year, and not ice-bound, for it is certain that no hippopotamus could live in a river which froze in winter. Yet among the remains of these animals are also found those of quite arctic species like the Musk-ox and the Reindeer, together with those of the Saiga Antelope, an inhabitant of the cold plateau of Tibet. The problem is: How could these creatures, one a dweller in warm rivers and the others inhabitants of cold arctic or sub-arctic regions, have existed together, apparently on the same area of ground? The answer, which does not seem to have occurred to naturalists who have discussed the question, seems to be plain enough. Any one who knows the conditions of the great rift valleys of Central Africa has the key to the solution of the puzzle. There was probably a very great difference in the vertical plane. Deep in the rift was probably a warm river, while above it may have been mountains from 10,000 to 20,000 feet high, with snow on the summits and glaciers in their valleys. On these cold and arctic heights the reindeer and the musk-ox would find congenial homes. Thousands of feet below, in the hot and narrow valley, the hippopotamus would revel in a warm and steamy climate. This is what actually occurs in the rift valleys of Central Africa, where the hippopotamus swims in rivers that are at no great distance from snow-covered and ice-capped mountains.

CHAPTER XX

THE DUGONG, MANATEES, WHALES, PORPOISES, AND DOLPHINS

BY F. G. AFLALO, F. Z. S.

The Dugong and Manatees

THESE curious creatures, which seem to have been the basis of much of the old mermaid legend, have puzzled many eminent naturalists. Before they were placed in an order by themselves, Linnæus had classed them with the Walrus, Cuvier with the Whales, and another French zoologist with the Elephants. They are popularly regarded as the cows of the sea-pastures. Their habits justify this. I have often watched dugongs on the Queensland coast browsing on the long grasses, of which they tear up tussocks with sidelong twists of the head, coming to the surface to breathe at short intervals.

Omitting the extinct Rhytina, otherwise known as Steller's Sea-cow, which was exterminated in the Bering Strait not very long after civilised man had first learnt of its existence, we have to consider two distinct groups, or genera, of these sirenians. The DUGONG is the representative of the first, and the two MANATEES belong to the other.

The dugong is found on the coasts of Northern Australia, in many parts of the Indian Ocean (particularly off Ceylon), and in the Red Sea. It is easily distinguished, by even superficial observation, from the manatees. Its tail is slightly forked, somewhat like that of the whales: the tail of manatees, on the other hand, is rounded. The dugong's flippers, to which we also find a superficial resemblance in those of the whale, show no traces of external nails: in those of the manatees, which show projecting nails, there is a considerable power of free movement (the hands being, in fact, used in manipulating the food), which is not the

Photo by A. S. Rudland & Sons

DUGONG

A vegetable-feeding sea-mammal from the Indian Ocean and North Australian waters

Photo by A. S. Rudland & Sons

AMERICAN MANATEE

Found in the Amazons River. The Manatees differ remarkably from the Dugong in the number and structure of their teeth

case in the limbs of the whale. The body of the dugong is almost smooth, though there are bristles in the region of the mouth: that of the manatees is studded with short hairs. The male dugong has two large tusks: in neither sex of the manatees are such tusks developed. Finally, a more detailed examination of the skeletons would reveal the fact that, whereas the dugong has the usual seven bones in the neck, that of the manatees has only six.

When we come to the Whales, we shall encounter that very characteristic covering known as "blubber"; and, though it is present in smaller quantity, these sirenians have blubber as well. Complex stomachs they also have, like the whales, only in their case both the nature of the food and the structure of the teeth point clearly to a ruminating habit, which, for reasons that will be given in the right place, seems inadmissible in the whales. In both dugong and manatees the mouth is furnished with singular horny plates, the precise use of which does not appear to have been satisfactorily determined; and the upper lip of the manatee is cleft in two hairy pads that work laterally. This enables the animal to draw the grass into its mouth without using the lower lip at all.

In their mode of life the dugong and manatees differ as widely almost as in their appearance; for the former is a creature of open coasts, whereas the manatees hug river-estuaries and even travel many miles up the rivers. Of both it has been said that they leave the water at night, and the manatees have even been accused of plundering crops near the banks. The few, however, which have been under observation in captivity have always been manifestly uncomfortable whenever, by accident or otherwise, the water of their tank was run off, so that there is not sufficient reason for believing this assertion.

This group of animals cannot be regarded as possessing any high commercial value, though both natives and white men eat their flesh, and the afore-mentioned rhytina was, in fact, exterminated solely for the sake of its meat. There is also a limited use for the bones as ivory, and the leather is employed on a small scale, — a German writer has, in fact, been at great pains to prove that the Tabernacle, which was 300 cubits long, was roofed with dugong-skin, and the Red Sea is certainly well within the animal's range.

The Whales, Porpoises, and Dolphins

Although anatomists have good reason for suspecting that all the members of the Whale Tribe are directly descended from river-dwelling forms, if not indeed, more remotely, from some land animal, there is something appropriate in the fact of the vast ocean, which covers something like three-quarters of the earth's surface, producing the mightiest creatures which have ever lived. There should also be some little satisfaction for ourselves in the thought that, their fish-like form notwithstanding, these enormous beings really belong to the highest, or mammalian, class of animal life.

One striking feature all these many-sized cetaceans have in common, and that is their similarity of form. Though they may vary in length from 70 to 7 feet, their outline shows a remarkable uniformity. Important internal and even external differences there may be. A whale may be toothed or toothless; a dolphin may be beaked or round-headed; either may be with or without a slight ridge on the back or a distinct dorsal fin; but no cetacean could well be mistaken for an animal of any other order. It is as well to appreciate as clearly as possible this close general resemblance between the largest whale and the smallest dolphin, as the similarity is one of some interest; and we may estimate it at its proper worth if we bear in mind that two species of cetaceans, outwardly alike, may not, perhaps, be more closely allied than such divergent ruminant types as the elephant, the giraffe, and the gazelle.

Reference has already been made to the fact that the whales are true mammals, and we must now clearly set before us the justification for separating them from the Fishes — to which any one with a superficial knowledge of their habits and appearance would unhesitatingly assign them — and raising them to the company of other mammals. Let us first separate them from the Fishes. The vast majority of fishes, with some familiar exceptions like the conger-eel, are covered with scales: whales have no scales. The tail of fishes, often forked like that of whales, is set vertically: in whales the tail is set laterally, and for this a good reason will presently be shown. Fishes have anal fins: whales not only have no anal fins, but their so-called pectoral fins differ radically from the fins of fishes. Fishes breathe with the aid of gills: whales have

Photo by A. S. Rudland & Sons

NARWHAL

An Arctic whale, with one or rarely two long spears of bone projecting from the head

no gills. Fishes, in the vast majority of cases, reproduce their young by spawning, the eggs being left to hatch out either in gravel-beds or among the water-plants, lying on the bottom (as in the case of the herring), or floating near the surface (as in that of the plaice): whales do not lay eggs, but bear the young alive. This brings us to the simple points of resemblance between them and other mammals. When the young whale is born, it is nourished on its mother's milk. This alone would constitute its claim to a place among the highest class. Whales breathe atmospheric air by means of lungs. Hair is peculiarly the covering of mammals, just as scales are characteristic of fishes and feathers of birds. Many whales, it is true, have no

Photo by A. S. Rualand & Sons

GRAMPUS, OR KILLER

A carnivorous cetacean with large teeth, often found in the North Sea

hair; but others, if only in the embryonic stage, have traces of this characteristic mammalian covering. It must, moreover, be remembered that in some other orders of mammals the amount of hair varies considerably — as, for instance, between the camel and rhinoceros.

Having, then, shown that whales are mammals, we must now determine the chief features of the more typical members of the order. The extremities of whales are characteristic: a large head, occupying in some species as much as one-third of the total length; and the afore-mentioned forked, or lobed, tail set laterally. The flippers, which bear only a slight resemblance to the pectoral fins in fishes, are in reality hands encased in swimming-gloves. In some whales these hands are five-fingered, in others the fingers number only four,

but many of the fingers contain more bones than the fingers of man. In some whales we find a dorsal fin, and this, as also the flippers, acts as a balancer. In no whale or porpoise is there any external trace of hind limbs, but the skeleton of some kinds shows in varying stages of degradation a rudimentary bone answering to this description. Perhaps, however, the most distinctive feature of whales is the blow-hole, situated, like the nostrils of the hippopotamus, on the upper surface of the head, and similarly enabling the animal to breathe the air without exposing much of its head above the surface of the water. The blow-hole (or blow-holes, for whalebone-whales have two) may be said to take the place of nostrils as regards the breathing, though perhaps no sense of smell is included in its functions. In the Sperm-whale, or Cachalot, there is a single S-shaped blow-hole near the end of the snout. The well-known spouting of whales is merely the breathing out of warm vapour, which, on coming in contact with the colder air — and it should be remembered that most whaling is carried on in the neighbourhood of icebergs — condenses in a cloud above the animal's head. I have seen many a sperm-whale spout, and the cloud of spray, often mixed with a varying volume of water if the whale commences to blow before its blow-hole is clear of the surface, drifts forward over the forehead. This is due to the forward position of the blow-hole. I never to my knowledge saw a whalebone-whale spouting, but its double jet is said to ascend vertically over its back, and this would in like manner be accounted for by the more posterior position of the blow-holes. Having filled its lungs, which are long and of simple structure, with fresh air, in enormous draughts that fill the great cavities of its chest, the whale sinks to the depths. There, in ordinary circumstances, it will lie for a quarter of an hour or more, but the pain of the harpoon and the knowledge that there is danger at the surface may keep it below for as much as an hour. When it has to breathe again, a few powerful strokes from the laterally set tail suffice to bring it quickly to the surface. This is not the place for a detailed anatomy of the whale, but no one can fail to notice with admiration such parts of its equipment for the battle of life as the structure of its windpipe, which enables it to breathe with comfort with its mouth full of water, the complicated network of blood-vessels that ensures the slow and thorough utilising of all the oxygen in its lungs while it remains at the bottom, and the elastic cushion of blubber that makes this gigantic animal indifferent to extremes of pressure and temperature. Thanks mainly to its coat of blubber, the whale exists with equal comfort at the surface or hundreds of fathoms below it; in the arctic or in tropical seas.

It is not perhaps in keeping with the plan of this work that we should consider in detail the soft parts of the whale's inside. One or two parts of its feeding and digestive mechanism may, however, offer some points of passing interest. The complex stomach, which is divided into chambers, like that of the ruminants already described, has suggested that the latter function

Photo by A. S. Rudland & Sons

SHORT-BEAKED RIVER-DOLPHIN

In this type the head is produced into a beak, supported in the upper jaw by a mass of ivory-like bone

may in a modified process be performed by whales. It is, however, evident that the teeth of toothed whales are in no way adapted to the act of mastication, which is inseparable from any conception of ruminating, while the toothless whales have as complicated a stomach as the rest. Mr. Beddard, writing on the subject in his interesting "Book of Whales," takes the more reasonable view that the first chamber of the stomach of whales should be regarded rather as a storehouse in which the food is crushed and softened. The teeth of whales, the survival of which in the adult animal offers the simplest basis of its classification under one or other of the two existing groups, or sub-orders, are essentially different from the teeth of many other kinds of mammals. It cannot, perhaps, be insisted that the distinctive terms employed for these two categories of whales are wholly satisfactory. For instance, the so-called "toothless" whales have distinct teeth before birth, thus claiming descent from toothed kinds. On the other hand, the so-called "toothed" whales are by no means uniformly equipped in this respect, some of the porpoises having as many as twenty-six teeth, distributed over both jaws, while the bottlenoses have no more than two, or at most four, and these in the lower jaw only. Only the lower jaw, in fact, of the great sperm-whale bears teeth that are of any use, though there are smaller and functionless teeth in the gums of the upper. The teeth of whales, by the way, are not differentiated like our canines and molars, but are all of one character. Although, in "toothless" whales, the fœtal teeth disappear with the coming of the baleen, or whalebone, the latter must not, in either structure or uses, be thought to take their place. The plates of whalebone act rather as a hairy strainer. Unless we seek a possible analogy at the other end of the mammalian scale, in the Australian duck-bill, the feeding of the whalebone-whales is unique. They gulp in the water, full of *plankton*, swimming open-mouthed through the streaks of that substance. Then the huge jaws are closed, and the massive tongue is moved slowly, so as to drive the water from the angles of the mouth through the straining-plates of baleen, the food remaining stranded on these and on the tongue. The size and number of the baleen-plates appear to vary in a degree not yet definitely established; but there may, in a large whale, be as many as between 300 and 400 on either side of the cavernous mouth, and they may measure as much as 10 or 12 feet in length and 7 or 8 feet in width.

Photo by A. S. Rudland & Sons

SOWERBY'S BEAKED WHALE

One of the rarest of whales. It probably inhabits the open seas

An enumeration of such whales and porpoises and dolphins as have at one time or other been stranded on the shores of the British Isles may serve as an epitome of the whole order. Only one interesting group, in fact — the River-dolphins of the Ganges and Amazons — is unrepresented in the list. Whales, either exhausted or dead, are periodically thrown up on our coasts, even on the less-exposed portions — one of the most recent examples in the writer's memory being that of a large specimen, over 60 feet long, stranded on the sands near Boscombe, in Hampshire, and the skeleton of which at present adorns Boscombe Pier. It was one of the rorquals, or finbacks, probably of the species called after Rudolphi; but the skeleton is imperfect, though its owner, Dr. Spencer Simpson, appears to have preserved some details of its earlier appearance. It should be remembered that many of the following can only be regarded as "British" with considerable latitude, the records of their visits being in

some cases as rare as those of the rustic bunting and red-necked nightjar among birds, or of the derkio and spotted dragonet among fishes.

British zoologists, however, usually include the following: — WHALEBONE-WHALES: Southern Right-whale; Humpback; Finbacks, or Rorquals. TOOTHED WHALES: Sperm-whale, or Cachalot; Narwhal; Beluga, or White Whale; Grampuses; Beaked Whale; Broad-fronted Whale; Cuvier's Whale; Sowerby's Whale; Pilot-whale; Porpoise; Dolphin; White-sided Dolphin; White-beaked Dolphin; Bottlenose.

A selection may therefore be made of five of the most representative of these species — the SOUTHERN WHALE, the CACHALOT, the NARWHAL, the PORPOISE, and the DOLPHIN.

The SOUTHERN WHALE, which, in common with the closely allied polar species, whaling-crews call "right," seeing that all other kinds are, from their point of view, "wrong," is probably the only right-whale which has ever found its way to our shores. Some writers include the Greenland Right-whale, but their authority for this is doubtful. It is said to grow to a length of at any rate 70 feet, though 55 feet would perhaps be more common for even large specimens. In colour it is said to be dark above, with a varying amount of white or grey on the flippers and under-surface. The head and mouth are very large, occupying in some cases one-third of the total length, and the baleen-plates measure as much as 8 or 10 feet in length and 5 or 6 feet in width. The species has no back-fin, but there is a protuberance on the snout, known technically as the "bonnet." This whale appears to give birth to its single calf some time in the spring months, and the mother shows great affection for her offspring. The HUMPBACK is distinguished from the right-whales externally by its longer flippers and the prominence on its back, and internally by the fluted skin of the throat. The FINNERS, or RORQUALS, have a distinct back-fin. They feed on fishes and cuttles, and I have more than once known a rorqual, which looked fully 50 feet long (comparing it roughly with my 24-foot boat), to swim slowly round and round my lugger, down on the Cornish coast, puffing and hissing like a torpedo-boat on its trial trip, rounding up the pilchards in a mass, and every now and then dashing through them open mouthed with a terrific roar, after several of which helpings it would sink out of sight and not again put in an appearance.

The SPERM-WHALE, or CACHALOT, may serve as our type of the toothed whales. It attains to the same great dimensions as the largest of the whalebone group. A more active

Photo by A. S. Rudland & Sons

COMMON PORPOISE

From 4 to 5 feet long. It lives in "schools," or companies, and pursues the herrings and mackerel

animal for its size could scarcely be conceived; and I have seen one, in the Indian Ocean, fling itself three or four times in succession out of water like a salmon, striking the surface each time as it fell back with a report like that of a gun. No one appears to have explained whether performances of this sort are due to mere playfulness, or, as seems more probable, to the attacks of parasites or such larger enemies as sharks or "killers." I have also seen four thresher-sharks leaping out of water, and falling with a loud blow on the whale's back; but the victim lay quite still in this case, and may in fact have been worn out before we came upon the scene. I wish to add that I took the word of the skipper, himself an old whaling-captain, for their identity as threshers. The dazzling sun shone full on them, and on the sea between, and it was impossible, even with the ship's telescope, to recognise them with any accuracy. The cachalot has a very different profile from what any one who had seen only its skull in a museum would be led to expect, for the sperm-cavity in the forehead is not indicated in the bones. The structure of the head enables the animal to drop the lower jaw almost at right angles to the upper; and Mr. Frank Bullen quotes, in his fascinating "Cruise of the Cachalot," the current belief that it does so to attract its prey by the whiteness of its teeth and palate. Although both fishes and cephalopods are very curious, even to their own destruction, it is doubtful whether the whale could not catch its food more rapidly by swimming open-mouthed through the acres of floating squid encountered all over the warmer waters of the ocean.

Photo by A. S. Rudland & Sons

ELLIOTT'S DOLPHIN

One of the commoner Indian species

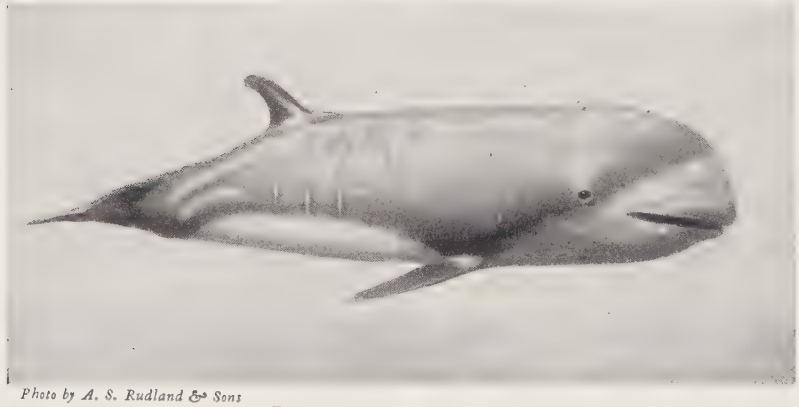


Photo by A. S. Rudland & Sons

RISSO'S DOLPHIN

About 13 feet in length, found in almost all oceans

The NARWHAL, an arctic type, may be distinguished from all other cetaceans by the single spiral tusk in the left side of the head of the male. Sometimes the right tusk grows as well, and either may attain a length of as much as 8 feet; but in the female both teeth remain undeveloped.

The COMMON PORPOISE of our own seas, distinguished by its rounded head from the equally common beaked dolphin, is too familiar to need much description. It grows to a length of 5 or 6 feet, and is dark in colour on the back and white beneath. Its conspicuous back-fin is always recognisable when it gambols with a herd of its fellows; and a line of these sea-pigs, a mile or so in length, is no uncommon sight, their presence inshore being indicative on some parts of the coast of the coming of east wind. The porpoise, which has,

Photo by A. S. Rudland & Sons

BOTTLE-NOSED DOLPHIN

From 8 to 9 feet long, found from the Mediterranean to the North Sea

like many of its group, teeth in either jaw, is a voracious feeder, preying in estuaries on salmon and flounders, and on more open parts of the coast on pilchards and mackerel. It is occasionally a serious nuisance in the Mediterranean sardine-fisheries, and I have known of the fishermen of Collioure, in the Gulf of Lyons, appealing to the French Government to send a gunboat from Toulon that might steam after the marauders and frighten them away. One of the most remarkable cases of a feeding porpoise that I can recall was that of one which played with a conger-eel in a Cornish harbour as a cat might play with a mouse, blowing the fish 20 or 30 feet through the air, and swimming after it so rapidly as to catch it again almost as it touched the water.

The DOLPHIN, which is in some seasons as common in the British Channel as the more familiar porpoise, is distinguished by its small head and long beak, the lower jaw always carrying more teeth than the upper. It feeds on pilchards and mackerel, and, like the porpoises, gambols, particularly after an east wind, with its fellows close inshore. There are many other marine mammals somewhat loosely bracketed as dolphins. RISSO'S DOLPHIN, for instance, a rare visitor to our coasts, has a striped skin, and its jaws are without teeth, which distinguish it from the common dolphin and most of the others. It cannot therefore feed on fishes, and most probably eats squid and cuttle-fish. The BOTTLE-NOSED DOLPHIN, a species occurring in the greatest numbers on the Atlantic coast of North America, is regularly hunted for its oil. HEAVYSIDE'S DOLPHIN, which hails from South African waters, is a smaller kind, chiefly remarkable for the curious distribution of black and white on its back and sides.

A word must, in conclusion, be said on the economic value of the whales. Fortunately, as they are getting rarer, substitutes for their once invaluable products are being from time to time discovered, and much of the regret at their extermination by wasteful slaughter is sentimental and not economic. For whalebone it is not probable that a perfect substitute will ever be found. It therefore maintains a high price, though the former highest market value of over $10,000 per ton has fallen to something nearer the half. The sperm-oil from the sperm-whale, and the train oil from that of the right-whales, the spermaceti out of the cachalot's forehead and the ambergris secreted in its stomach, are the other valuable products. Ambergris is a greyish, fatty secretion, caused by the irritation set up in the whale's inside by the undigested beaks of cuttle-fish. Its market price is about $25 per ounce. A lump of 240 lbs. sold for nearly $100,000.

Photo by A. S. Rudland & Sons

HEAVYSIDE'S DOLPHIN

A small, peculiarly coloured species from the Cape

CHAPTER XXI

THE SLOTHS, ANT-EATERS, AND ARMADILLOS

BY W. P. PYCRAFT, A. L. S., F. Z. S.

Photo by A. S. Rudland & Sons

NORTHERN TWO-TOED SLOTH (COSTA RICA)

This is also known as Hoffmann's Sloth. The appellation "two-toed" refers to the fore limb only. The hind foot has three toes

THE very remarkable assemblage of animals we are now about to consider includes many diverse forms, bracketed together to constitute one great group; and this on account of the peculiarities of the structure and distribution of the teeth, which are never present in the front of the jaw, and may be absent altogether. Of the five groups recognised, three occur in the New and two in the Old World. All have undergone very considerable modification of form and structure, and in every case this modification has tended to render them more perfectly adapted to an arboreal or terrestrial existence. Flying or aquatic types are wanting. Whilst one great group — the Sloths — is entirely vegetarian, the others feed either on flesh or insects.

THE SLOTHS

In the matter of personal appearance Nature has not been kind to the SLOTH, though it is certainly true that there are many uglier animals — not including those, such as some of the Monkey Tribe and certain of the Swine, which are positively hideous. The mode of life of the sloth is certainly remarkable, for almost its whole existence is passed among the highest trees of the densest South American forests, and passed, too, in

a perfectly topsy-turvy manner, inasmuch as it moves from bough to bough with its legs up in the air and its back towards the ground. It walks and sleeps suspended beneath the boughs instead of balanced above them, securely holding itself by means of powerful hooked claws on the fore and hind feet. This method of locomotion, so remarkable in a mammal, coupled with the deliberate fashion in which it moves, and the air of sadness expressed in its quaint physiognomy — large-eyed, snub-nosed, and earless — on which there seems to dwell an ever-present air of resignation, led the great Buffon to believe that the sloth was a creature afflicted of God for some hidden reason man could not fathom! His sympathy was as certainly wasted as his hasty conclusion was unjustified. There can be no doubt but that the life led by the sloth is at least as blissful as that of its more lively neighbours — the spider monkeys, for instance. Walking beneath the boughs comes as natural to the sloth as walking on the ceiling to the fly.

The sloth sleeps, as we have already remarked, suspended from a bough. During this time the feet are drawn close together, and the head raised up and placed between the fore legs, as in the cobego, which we depicted asleep on page 170, as our readers will remember. In the sleeping position the sloth bears a striking resemblance to the stump of a lichen-covered bough, just as the cobego resembles a fruit. Thus is protection from enemies gained. The resemblance to lichen is further aided by the fact that the long, coarse hair with which the sloth is clothed becomes encrusted with a peculiar green alga — a lowly form of vegetable growth — which lodges in certain grooves or flutings peculiar to the hair of this animal. Such a method of protection is unique amongst the Mammalia. As the sloths sleep by day and feed by night, the usefulness of such a method of concealment is beyond question.

Photo by L. Medland, F.Z.S.

THREE-TOED SLOTH

A remarkable peculiarity about the three-toed sloths is the fact that they have no less than nine vertebræ in the neck, instead of seven, as is usual among mammals

The strange form of locomotion of the sloths renders separate fingers and toes unnecessary, and so the fingers and toes have come to be enclosed in a common fold of skin, extending down to the base of the claws.

The sloths stand out in strong contrast to the volatile spider monkeys, with whom they share the forest; these have added a fifth limb in the shape of a prehensile tail, by which they may suspend themselves at will. The sloths, on the contrary, have no tail; they move deliberately, and do not require it. The monkeys move by prodigious leaps, taken not seldom by gathering impetus by swinging on their tails.

The great naturalist Bates writes of the sloth: "It is a strange sight to watch this uncouth creature, fit production of these silent shades, lazily moving from branch to branch. Every movement betrays, not indolence exactly, but extreme caution. He never loses his hold from one branch without first securing himself to the next. . . . After watching the animal for about half an hour, I gave him a charge of shot; he fell with a terrific crash, but caught a bough in his descent with his powerful claws, and remained suspended. Our Indian lad

tried to climb the tree, but was driven back by swarms of stinging ants; the poor little fellow slid down in a sad predicament, and plunged headlong into the brook to free himself."

On another occasion the same writer tells us he "saw a sloth swimming across a river at a place where it was 300 yards broad. I believe it is not generally known that this animal takes to the water. Our men caught the beast, cooked and ate him."

In past ages gigantic ground-sloths roamed over South America. The largest of these, the Megatherium, rivalled the elephant in size. Descendants of these giants appear to have lingered on till comparatively recent times, as witness the wonderful discovery by Moreno, made during last year (1900) in a cave in Patagonia. This was nothing less than a skull and a large piece of the hide of one of these monsters in a wonderful state of preservation, showing indeed undoubted traces of blood and sinew. That the hide was removed by human hands there can be no doubt, for it was *rolled up* and turned inside-out. Immediately after this discovery was announced, an expedition was dispatched from England to hunt, not so much for more remains, but for the animal itself. Time will show whether these efforts will prove successful.

The Ant-eaters

Unlike as the ant-eaters are to the sloths, they are nevertheless very closely related thereto. This unlikeness at the present day is so great that, were it not for "missing-links" in the shape of fossils, we should probably never have discovered the relationship. The head of the typical ant-eaters has been drawn out into a long tubular muzzle, at the end of which is a tiny mouth just big enough to permit the exit of a long worm-like tongue, covered with a sticky saliva. This tongue is thrust out with great rapidity amongst the hosts of ants and termites and their larvæ, on which they prey. These victims are captured by breaking open their nests. At once all the active inhabitants swarm up to the breach, and are instantaneously swept away by the remorseless tongue. The jaws of the ant-eaters are entirely toothless, and the eyes and ears are very small.

The largest species of ant-eater is about 4 feet long. It lives entirely upon the ground. Generally speaking, it is a harmless creature; but at times, when cornered, it will fight furiously, sitting up on its hind legs and hugging its foe in its powerful arms. Bates, the traveler-naturalist, relates an instance in which a dog used in hunting the Great Ant-eater was caught in its grip and killed. The tail of this large species is covered with very long hair, forming an immense brush. The claw on the third toe of each fore limb is of great size, and used for breaking open ants' and other insects' nests.

THE GREAT ANT-EATER

In walking the ant-eater turns its toes inwards, so that the claws turn upwards and inwards, the weight of the body being borne by a horny pad on the fifth toe, and the balls of the third and fourth toes

But besides the great ground ant-eater there are some tree-haunting species. These have a shorter muzzle, and short hair on the tail, which is used, as with the spider monkeys, as a

Photo by A. S. Rudland & Sons

TAMANDUA ANT-EATER

This species, which is a smaller animal than the Great Ant-eater, lives almost entirely in the trees, instead of on the ground

fifth limb. Curled round the bough of a tree, its owner is free to swing himself out on to another branch.

The smallest of the tree-dwelling species is not larger than a rat, and is a native of the hottest parts of the forests of South and Central America. The muzzle in this species is quite short, not long and tubular, as in the larger species. It is a very rare animal, or is at least very seldom seen, a fact perhaps due to its small size. It is known as the TWO-TOED ANT-EATER, only the second and third fingers of the fore feet bearing claws.

Von Sack, in his "Narrative of a Voyage to Surinam," tells us that the natives of Surinam call this little animal "Kissing-hand" — "as the inhabitants pretend that it will never eat, at least when caught, but that it only licks its paws, in the same manner as the bear; that all trials to make it eat have proved in vain, and that it soon dies in confinement. When I got the first, I sent to the forest for a nest of ants; and during the interim I put into its cage some eggs, honey, milk, and meat; but it refused to touch any of them. At last the ants' nest arrived, but the animal did not pay the slightest attention to it either. By the shape of its fore paws, which resemble nippers, I thought that this little creature might perhaps live on the nymphæ of wasps, etc. I therefore brought it a wasps' nest, and then it pulled out with its nippers the nymphæ from the nest, and began to eat them with the greatest eagerness, sitting in the posture of a squirrel. I showed this phenomenon to many of the inhabitants, who all assured me that it was the first time they had ever known that species of animal take any nourishment."

THE ARMADILLOS

Readers of this book will doubtless have noticed long ere this how manifold are the devices for the purpose of defence adopted by the Mammalia. The ARMADILLOS have certainly selected the most complete, having encased themselves in an impenetrable bony armour as perfect as the coat of mail of the warrior of the Middle Ages. Concerning this and the variations thereon adopted by the different members of the group we shall speak presently.

Armadillos are mostly confined to South America, and occur both in the open pampas and the shady depths of the forest. They live in burrows, which they dig with incredible speed. These burrows are generally found in the vicinity of the nests of ants and termites, which form their staple diet. One species, however, at least feeds apparently with equal relish upon vegetable matter, eggs, young birds, mice, snakes, and carrion.

The bony armour is disposed over the crown of the head, back, and flanks. It is made up of numerous small, bony plates, buried deep in the skin, and each overlaid by a horny scale. The tail is protected by bony rings. The plates covering the shoulders and those directly over the hindquarters fuse into a solid mass, thus forming chambers into which the limbs can be withdrawn. In the region of the body, between these two shields, the plates are arranged in rows encircling the body, thus permitting the animal to roll itself up as occasion may require. Hairs grow out between the plates, and in some cases give the animal quite a furry appearance.

Speaking of the burrowing powers of the armadillo, Darwin, in his most fascinating "Voyage of the Beagle," tells us that "the instant one was perceived, it was necessary, in order to catch it, almost to tumble off one's horse; for in soft soil the animal burrowed so quickly that its hinder quarters would almost disappear before one could alight. It seems almost a pity to kill such nice little animals; for as a Gaucho said, while sharpening his knife on the back of one, 'Son tan mansos' (They are so quiet)." As a rule, armadillos are regarded as animals loving dry, sandy wastes; nevertheless, they are said to be able to swim both well and swiftly. The flesh of the armadillo is apparently by no means unpalatable.

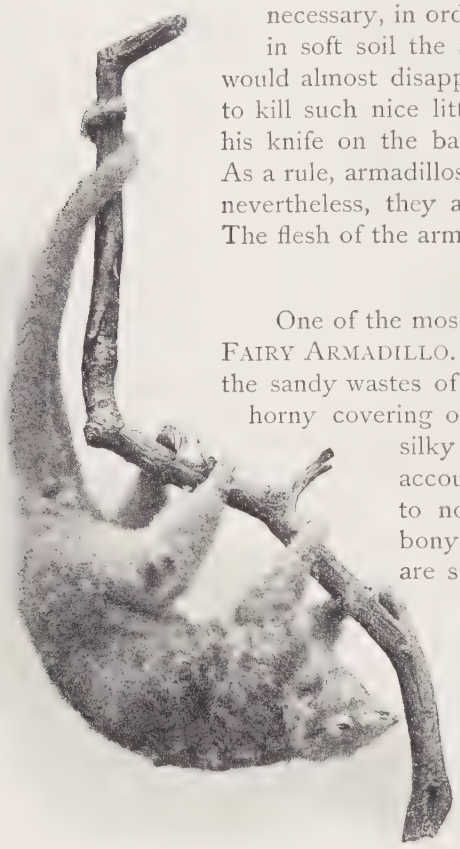


Photo by A. S. Rudland & Sons

TWO-TOED ANT-EATER

Although the fore feet have four toes, only the second and third bear claws; hence the name "Two-toed" Ant-eater

The Pichiciago

One of the most remarkable of the armadillos is the PICHICIAGO, or FAIRY ARMADILLO. It is a tiny creature of some 5 inches long, found in the sandy wastes of the western part of the Argentine Republic. The horny covering of the bony plates is pinkish colour, and the hair is silky in texture and snow-white. But it is not on this account that the fairy armadillo is remarkable: its claim to notoriety rests on the peculiar arrangement of the bony plates constituting the armour. These bony plates are small and thin, and covered, as in other species, with a horny coat; but instead of being embedded in the skin, they are attached only along the middle of the back, and project freely over the body on either side, leaving a space between the shield and the body. The hinder end of the body is specially protected by a nearly circular vertical shield, firmly fixed to the hip-girdle. This shield, it is said, is used as a plug to fill up its burrow with.

The Peludo

Armadillos of the normal type, wherein the body armour is embedded in the skin, are represented by numerous species. Of one, known as the PELUDO, Mr. Hudson has given us some interesting details. "It feeds," he tells us, "not only upon insects, but also upon vegetable matter, eggs, young birds, and carrion. Its method of capturing mice was certainly ingenious. It hunted by smell, and when nearing its prey became greatly agitated. The exact spot discovered, the body was raised slowly to a sitting posture, and then flung suddenly forwards, so that the mouse or nest of mice was imprisoned beneath, and promptly dispatched." "Still more remarkable," says Mr. Lydekker, "is the manner in which a peludo has been observed to kill a snake, by rushing upon it and proceeding to saw the unfortunate reptile in pieces by pressing upon it closely with the jagged edges of its armour, and at the same time moving its body backwards and forwards. The struggles of the snake were all in vain, as its fangs could make no impression upon the panoply of its assailant, and eventually the reptile slowly dropped and died, to be soon afterwards devoured by the armadillo, which commenced the meal by seizing the snake's tail in its mouth, and gradually eating forwards."

Photo by York & Son

WEASEL-HEADED ARMADILLO

The weasel-headed armadillos have from six to eight movable bands in the bony armour in which they are encased

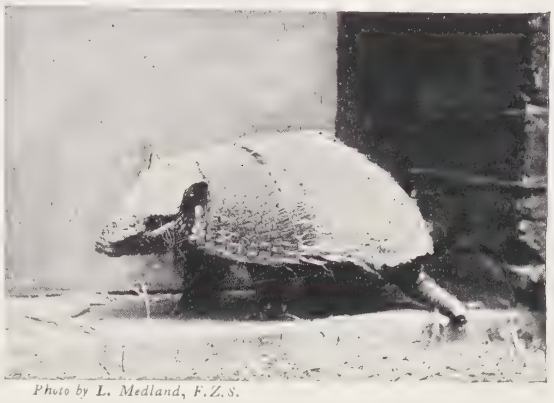


Photo by L. Medland, F.Z.S.

HAIRY-RUMPED ARMADILLO

This species, like the Peba Armadillo, varies its diet with carrion

The Pangolins

The PANGOLINS, or SCALY ANT-EATERS, are perhaps even more curious creatures than the armadillos. They have been likened in appearance to animated spruce fir-cones, to which indeed they bear a strange resemblance. This resemblance is due to the wonderful armature of the skin, which takes the form of large overlapping, pointed, horny plates or scales. The pangolins are confined to the Old World, occurring in South Africa and South-eastern Asia. Like the American Ant-eaters, teeth are wanting, and the tongue is long and worm-like, being employed in the capture of insects, as in the New World ant-eaters.

The scales of the MANIS are formed by the fusion together of fine hairs. Like the spines of the hedgehog and porcupine, they serve the purpose of offensive defence; for when the manis rolls itself up, these pointed scales project at right angles to the body, and offer a formidable resistance to any enemy whatsoever. They also serve to break the force of a fall, which, indeed, is often voluntary; for should the animal wish to descend from the branch of a tree, it will often take a short cut to the ground by deliberately dropping, the force of the fall being entirely broken by the elastic scales.

In climbing, the tail is of the greatest service, its under-surface being clothed with pointed scales, which serve as so many climbing-hooks. The grasp of a tree-trunk gained by the hind legs and tail is so secure that the body can be moved to a horizontal position with ease. In a specimen kept in captivity by Mr. Fraser, this horizontal movement was a form of exercise which appeared to afford the greatest pleasure.

Photo by L. Mea.and, F.Z.S.] [*North Finchley*

PEBA ARMADILLO

This species lives largely upon carrion, which it buries in its burrow till wanted

Photo by York & Son] [*Notting Hill*

KAPPLERS' ARMADILLO

This is a variety of the Peba Armadillo, inhabiting Surinam

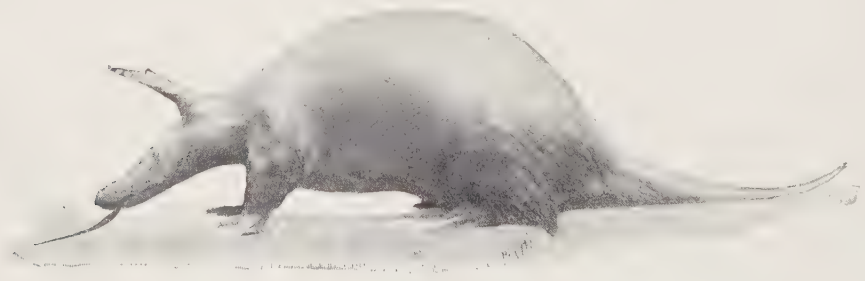
The Aard-vark

The custom of naming newly discovered animals after well-known forms to which they are supposed to bear some resemblance, physically or otherwise, is a common one. The animal now under consideration shows this once more, having originally received the name of Aard-vark (Earth-pig) from the Boers of the Cape. The aard-vark is a most decidedly ugly animal, and justifies its name in several particulars. It is hunted for the sake of its hide, which is of great thickness and resembles that of the pig, but is sparsely covered with hairs, the general shape of its body being not unlike that of a long-headed, short-legged, heavy-tailed pig. The whole animal is about 6 feet long. In a wild state, or even in captivity, it is but rarely seen, since it is a night-feeder, and passes the day in sleep deep down in a burrow. This burrow it digs for itself with the aid of powerful claws borne on the fore feet. It lives principally on ants and termites, breaking down their nests, and remorselessly sweeping up the frightened occupants with a long, sticky tongue, as soon as they rush to the seat of the disturbance which has broken up the harmony and order of their community. At one time it was believed that the aard-vark was a close ally of the pangolin, but later researches have disproved this, and have furthermore thrown doubt upon the probability of its relationship with any of the members of this group of mammals at all.

There are two species of this animal — the Cape Aard-vark of South and South-east Africa, and the Ethiopian Aard-vark of North-east Africa.

Where the nest-building ants are most common, there will the aard-vark — or Innagus, as the Boers sometimes call it — be most plentiful. The nests of these ants are huge structures of from 3 to 7 feet high, and often occupy vast areas of ground, extending as far as the eye can reach. They are substantially built, and swarm with occupants, and consequently are quite worth raiding. But the aard-vark has become much less common since a price has been set upon its skin. The powers of digging of these animals are so great that they can completely bury their large bodies in a few minutes, even when the ground has been baked by the sun into something like adamantine hardness. In excavating their burrows, the ground is thrown out by the fore feet, in huge lumps, through or rather between the hind legs. Shy and suspicious, the least unusual sound will send them scuttling to earth, for their sense of hearing is very keen. They seem to change their minds somewhat frequently, when engaged in digging out a new burrow; for half-excavated burrows in the side of ant-hills are very commonly met with. A fully grown aard-vark is about 6 feet long — generally rather more. Although this animal is frequently kept in captivity, it is but rarely seen by visitors, owing to its nocturnal habits, of which we have already spoken.

The teeth of the aard-vark are sufficiently remarkable to justify notice here. Only the crushing teeth are represented — that is to say, the front or cutting teeth are conspicuous by their absence. These crushing teeth number from eight to ten in the upper and eight in the lower jaw, on each side; but in the adult fewer would be found, the number being reduced to five in each side of the jaws — that is to say, there are but twenty all told. In structure these teeth are quite remarkable, differing entirely from those of all other mammals, and resembling those of some fishes; furthermore, they have no "roots," but instead grow continually throughout life, which "rooted" teeth do not.



By permission of the Hon. Walter Rothschild

CAPE AARD-VARK

The ants upon which the aard-vark largely subsists appear to be very fattening, and impart a delicate flavour to the flesh, especially to the hams, which are greatly esteemed

Photo by Billington] [*Queensland*

THE GREAT GREY KANGAROO

The massive hind limbs and tail of the animal constitute, in its characteristic resting pose, a most efficient supporting tripod

CHAPTER XXII

MARSUPIALS AND MONOTREMES

BY W. SAVILLE-KENT, F.L.S., F.Z.S.

MARSUPIALS

WITH the order of the Pouched Mammals we arrive — with the exception of the Echidna and Platypus, next described — at the most simply organised representatives of the Mammalian Class. In the two forms above named, egg-production, after the manner of birds and reptiles, constitutes the only method of propagation. Although among marsupials so rudimentary a method of reproduction is not met with, the young are brought into the world in a far more embryonic condition than occurs among any of the mammalian groups previously enumerated. There is, as a matter of fact, an entire absence of that vascular or blood connection betwixt the parent and young previous to birth, known as placentation, common to all the higher mammals, though certain of the more generalised forms have been recently found to possess a rudiment of such development. In correlation with their abnormally premature birth, it may be observed that a special provision commonly exists for the early nurture of the infant marsupials. In such a form as the Kangaroo, for example, the young one is placed, through the instrumentality of its parent's lips, in contact with the food-supplying teat, and to which for some considerable period it then becomes inseparably attached. Special muscles exist in connection with the parent's mammary glands for controlling the supply of milk to the young animal, while the respiratory organs of the little creature are temporarily modified in order to ensure unimpeded respiration. The fact of the young in their early life being commonly found thus inseparably adhering to the parent's nipple has given rise to the fallacious but still very widely prevalent idea among the Australian settlers that the embryo marsupial is ushered into the world as a direct outgrowth from the mammary region.

At the present day, with the exception of the small group of the American Opossums and the Selvas, the entire assemblage of marsupials, comprising some 36 genera and 150 species, are, singularly to relate, exclusively found in Australia, New Guinea, and the few neighbouring islands recognised by systematic zoologists as pertaining to the Australasian region. What is more, this region of Australasia produces, with some few insignificant exceptions, chiefly rodents, no other indigenous mammals.

It is interesting to note that within the limits of this isolated

Photo by Billington] [*Queensland*

SILVER-GREY KANGAROO

In general form the kangaroos are so like one another that one figure would almost serve for all

Drawn from nature by Geo. Brown.

THE GREAT KANGAROO LEAPING.

In this position the animal is represented the extraordinary size and strength of the hind limbs and tail are displayed to the best advantage. Both features are connected with the animal's marvelous powers of leaping.

and anciently founded marsupial order we have an epitome, as it were, of many of the more important groups of an equivalent classificatory value that are included among the higher mammalia previously described. In this relationship we find in the so-called Tasmanian Wolf, the Tasmanian Devil, and the "Native Cats" carnivorous and eminently predatory forms whose habits and general conformation are immediately comparable to those of the typical Carnivora. The Bandicoots, Banded Ant-eater, and Phascogales recall in a similar manner the higher Insectivora. In the tree-frequenting Opossums and Phalangers the external likeness and conformity in habits to the arboreal rodents is notably apparent, several of the species, moreover, possessing a parachute-like flying-membrane essentially identical with that which is found in the typical Flying-squirrels. An example in which the ground-frequenting or burrowing rodents are closely approached is furnished by the Australian Wombat, an animal which may be appropriately likened to an overgrown and lethargic Marmot. In this form, moreover, the rodent-like character of the dentition is especially noteworthy. The higher grass-eating

Photo by E. Landor] *[Ealing*

BLACK-STRIPED WALLABY

Female with half-grown young in her pouch

Photo by J. T. Newman] *[Berkhamsted*

BENNETT'S WALLABY AND THE GREAT GREY KANGAROO

This photograph illustrates the relative sizes of these two species

mammals find their counterparts in the family group of the Kangaroos, in which, in addition to their essentially herbivorous habits, the contour of the head and neck, together with the expressive eyes and large expanding ears, are wonderfully suggestive of the various members of the Deer Family. The Cuscuses of New Guinea and the adjacent islands, both in form and habits, somewhat resemble their geographical neighbours, the Lorises, belonging to the Lemur Tribe, compared with which higher mammals, however, they possess the advantage of an eminently serviceable prehensile tail. The Australian

Photo by D. Le Souef [*Melbourne*

ALBINO RED KANGAROOS

Albino kangaroos and other Australian animals have been observed to be the product of special, narrowly limited locations

Koala, or so-called "Native Bear," has been commonly compared by zoologists with the Edentate Sloths; while in the most recently discovered marsupial, the Pouched Mole, we have a counterpart, in both form and habits, of the familiar European species. Finally, in the small American section of the Marsupialia, we meet with a type — the so-called Yapock, or Water-opossum — in which the resemblances to an Otter, in both aspect and its aquatic habits, are so marked that the animal was originally regarded as a species only of the Otter Tribe.

The character of the *marsupium*, or pouch, differs materially among the various members of their order. It presents its most conspicuous and normal development in such animals as the Kangaroos, Wallabies, and the Australian Opossums or Phalangers. In the Tasmanian Wolf and the Bandicoots the pouch opens backwards. In such forms as the Phascogale, or Pouched Mouse, the pouch is reduced to a few rudimentary skin-folds, while in the Banded Ant-eater its position is occupied by a mere patch of longer hairs, to which the helpless young ones cling. On the same *lucus a non lucendo* principle there is no trace of a pouch in the Koala, nor in those smaller species of the American Opossums which habitually carry their young upon their back. Even in these pouchless marsupials, however, the peculiar marsupial bones are invariably present, and in all other essential details their accord with the marsupial type of organisation and development is fully maintained.

The Kangaroos

The typical and most familiar member of the Marsupial Order is the KANGAROO — the heraldic mammal of that vast island-continent in the South Seas, whose phenomenal advance by leaps and bounds, from what scarcely a century since was represented by but a few isolated settlements, has been aptly likened to the characteristic progression of this animal. Of kangaroos proper there are some twenty-four known species distributed throughout the length and breadth of Australia, extending southwards to Tasmania, and to the north as far as New Guinea and a few other adjacent islands.

In point of size the GREAT GREY KANGAROO and the RED or WOOLLY species run each other very closely. A full-grown male of either species will weigh as much as 200 lbs., and measure a little over 5 feet from the tip of the nose to the base of the tail, this latter important member monopolising another 4 or 4½ feet. The red or woolly species more especially affects the rocky districts of South and East Australia, while the great grey kind is essentially a plain-dweller and widely distributed throughout the grassy plains of the entire Australian Continent and also Tasmania. It is to the big males of this species that the titles of "Boomer," "Forester," and "Old Man Kangaroos" are commonly applied by the settlers, and the species with which the popular and exciting sport of a kangaroo hunt — the Antipodean substitute for fox-hunting — is associated. The pace and staying power of an old man kangaroo are something phenomenal. Fox-hounds would have no chance with it; consequently a breed of rough-haired greyhounds, known as kangaroo-dogs, are specially trained for this sport.

A run of eighteen miles, with a swim of two in the sea at the finish, and all within the space of two brief crowded hours, is one of the interesting records chronicled. The quarry, when brought to bay, is, moreover, a by no means despicable foe. Erect on its haunches, with its back against a tree, the dogs approach it at their peril, as, with a stroke of its powerful spur-armed hind foot, it will with facility disembowel or otherwise fatally maim its assailant. Another favourite refuge of the hunted "boomer" is a shallow water-hole, wherein, wading waist-deep, it calmly awaits its pursuers' onslaught. On the dogs swimming out to the attack, it will seize them with its hand-like fore paws, thrust them under water, and, if their rescue is not speedily effected, literally drown them. Even man, without the aid of firearms, is liable to be worsted in an encounter under these conditions, as is evidenced in the following anecdote.

A newly arrived settler from the old country, or more precisely from the sister island, ignorant of the strength and prowess of the wily marsupial, essayed his maiden kangaroo hunt with only a single dog as company. A fine grey boomer was in due course started, and after an exciting chase was cornered in a water-hole. The dog, rushing after it, was promptly seized and ducked; and Pat, irate at the threatened drowning of his companion, fired, but missed his quarry, and thereupon jumped into the water-hole, with the intention, as he afterwards avowed, "to bate the brains out of the baste" with the butt-end of his gun. The kangaroo, however, very soon turned the tables upon Pat. Before he had time to realise the seriousness of the situation he found himself lifted off his feet, and soused and hustled with such vigour that both Pat and his dog most narrowly escaped a watery grave. A couple of neighbours, by good luck passing that way, observed the turmoil, and came to the rescue.

Photo by W. Reid

TASMANIAN WALLABY

Has softer and thicker fur than its relative of the Australian mainland

Between them they beat off and killed the kangaroo, and dragged Pat to land in a half-drowned and almost insensible condition. Pat recovered, and vowed "niver to meddle with such big bastes" again.

The doe kangaroos, while of smaller size and possessing much less staying power than their mates, can nevertheless afford a good run for horses and dogs, and are commonly known as "flyers." When carrying a youngster, or "Joey," in her pouch, and hard pressed by the dogs, it is a common thing for the parent to abstract her offspring from the pouch with her fore paws, and to throw it aside into the bush. The instinct of self-preservation only, by the discharge of hampering impedimenta, is usually ascribed to this act; but it is an open question whether the maternal one of securing a chance of escape for her young, while feeling powerless to accomplish it for herself, does not more often represent the actual condition of the case.

In proportion to the size of its body the kangaroo yields but a limited amount of meat that is esteemed for food. The tail represents the most highly appreciated portion, since from it can be compounded a soup not only equal to ordinary ox-tail, but by gourmands considered so superior that its conservation and export have proved a successful trade enterprise. The loins also are much esteemed for the table, but the hind limbs are hard and coarse, and only appreciated by the native when rations are abnormally short. "Steamer," composed of kangaroo-flesh mixed with slices of ham, represented a standing and very popular dish with the earlier Australian settlers; but with the rapid disappearance of the animal before the advance of colonisation this one time common concoction possesses at the present day a greater traditional than actual reputation.

Photo by D. Le Souef [*Melbourne*

ALBINO RED-BELLIED WALLABY

Many of the Marsupials, including Kangaroos and the Opposum-like Phalangers, exhibit a tendency to albinism

The hunting of the kangaroo is conducted on several distinct lines, the method of its pursuit being varied, according to whether the animal is required for the primary object of food, for the commercial value of its skin, as a matter of pure sport, or to accomplish its wholesale destruction in consequence of its encroachments on the pasturage required for sheep- and cattle-grazing.

The greatest measure of healthy excitement in hunting the kangaroo, from the standpoint of pure sport, is no doubt to be obtained when running the marsupial down with horse and hounds in congenial company, as referred to on a previous page. The stalking of the animal single-handed on horseback or on foot, much after the manner of the deer, has also its enthusiastic votaries, and calls into play the greatest amount of patience and *savoir-faire* on the part of the sportsman. It has been affirmed by a Queensland writer, "To kill kangaroos with a stalking-horse requires the practice of a lifetime, and few 'new chums' have the patience to learn it. It is, in fact, only stockmen, black-fellows, and natives of the bush who can by this method expect to make kangaroo-shooting pay." The horse which is successfully employed by experienced bushmen for stalking purposes is specially trained to its work, and, walking apparently unconcernedly in the direction of the selected quarry, brings the gunners, if they are experts in the art of keeping themselves well concealed, within easy range. In this manner two or three kangaroos are not infrequently shot in the same stalk, the animals having a tendency, on hearing the report of the gun, but not locating the direction from which

Photo by Billington] [*Queensland*

ROCK–WALLABY

The Rock-Wallabies, in contradistinction to the Kangaroos, are for the most part nocturnal in their habits

Photo by D. Le Souef [*Melbourne*

PARRY'S WALLABY

In attitude of listening

it was discharged, to rush about in an aimless manner, and, as frequently happens, in the immediate direction of the hidden sportsman. In the good old times it is recorded that an experienced hand might kill as many as seventy or eighty kangaroos in a day by this stalking method. The marsupials are at the present date, however, so severely decimated that even in the most favourable settled districts a bag of from twelve to twenty head must be regarded as exceptional. Stalking the kangaroo on foot without the horse's aid is more strongly recommended to those to whom an occasional shot is considered sufficiently remunerative. Taking full advantage of intervening bushes and other indigenous cover, an approach to within a hundred yards or so of the quarry may be usually accomplished, though not quite so easily, perhaps, as might be at first anticipated. It is the habit of the kangaroo to sit up waist-high in the midst of the sun-bleached grass, which corresponds so closely in colour with its own hide that unless the animal is silhouetted against the sky-line it readily escapes detection.

The conditions under which the kangaroo is obtained for the main purpose of supplying the human commissariat is perhaps most aptly illustrated in connection with its chase as prosecuted by the Australian aborigines. In Tasmania and the Southern Australian States the primeval man is either extinct or more rare than the kangaroo. In the extreme north and far north-west, however, he still poses as "the lord of creation," and conducts his hunting expeditions on a lordly scale. The food-supply of the Australian native is essentially precarious. Long intervals of "short commons" are interspersed with brief periods of over-abundance, in which he indulges his appetite to its fullest bent. A kangaroo drive on native lines represents to the Australian mind one of these

Photo by D. Le Souef [*Melbourne*

PARRY'S WALLABY

Characteristic feeding attitude

last-named superlatively memorable occasions. The entire tribe, men, women, and all capable youths, participate in the sport. Fires are lit by one section of the tribe, according to the direction of the wind, encircling a vast area of the country, while the other section posts itself in detachments in advantageous positions to intercept the terrified marsupials as they fly in the presumed direction of safety to escape the devouring element. Spears and waddies and boomerangs, in the hands of the expert natives, speedily accomplish a scene of carnage, and the after feast that follows may perhaps be best left to the imagination of the reader. The encroachments of neighbouring natives on the happy hunting-grounds that time and custom have conceded to be the sole monopoly of any one particular tribe is most strenuously resented, and constitute one of the commonest sources of their well-nigh perpetual inter-tribal battles.

A kangaroo battue, as carried into practice by European settlers in those few remaining districts where the animal is sufficiently abundant to constitute a pest by its wholesale consumption of the much-prized pasturage, is far more deadly in its results to the unfortunate marsupials. Existing sheep-fences, supplemented by a large suitably enclosed yard, are first specially prepared for the reception of the expected victims. All the settlers, stockmen, and farm hands from the country round are pressed into service, and assemble on horseback or on foot at the appointed rendezvous at break of day. A widely spreading cordon of beaters being told off, a systematic drive is then commenced, which results in all the animals being driven towards and collected within the enclosed yard. The culminating scene is one of wholesale slaughter with club and gun. From these battues none of the unfortunate animals escape, as they are so closely hemmed in.

Photo by D. Le Souef, Melbourne

FOOT OF TREE-KANGAROO

Underside, showing peculiar skin-corrugations and the united second and third toes

The first record of the existence of the kangaroo, coupled with its characteristic name, is found associated, it is interesting to observe, with the history of one of the earlier voyages of Captain Cook. The neighbourhood of Cooktown, in Queensland, claims the honour of supplying the first example of the animal which was brought to Europe and astonished the zoologists of that time by the singularity of its form and reported habits. Captain Cook happened — in July, 1770 — to be laying up his ship, the *Endeavour*, for repairs, after narrowly escaping total wreck on the neighbouring Great Barrier Reef, in the estuary of the river subsequently coupled with his ship's name. Foraging parties, dispatched with the object of securing, if possible, fresh meat or game for the replenishment of the ship's well-nigh exhausted larder, returned with reports of a strange creature, of which they subsequently secured specimens. Skins were preserved and brought to England, but it was some little time before the zoological position and affinities of the creature were correctly allocated. By some naturalists it was regarded as representing a huge species of Jerboa, its near relationship to the previously known American Opossums being, however, eventually substantiated. The closer acquaintanceship with the peculiar fauna of Australia that followed upon Captain Cook's memorable voyage of discovery along the coast-line of that island-continent soon familiarised naturalists with many other of the allied species of which the kangaroo constitutes the leading representative.

Photo by W. Saville-Kent, F.Z.S.

BROWN TREE-KANGAROO

This species represents the group in North Queensland

Some considerable amount of obscurity is associated with the prime origin of the animal's almost world-wide title of "Kangaroo." It is most commonly accepted as representing the native name for the creature in that Queensland district from whence it was first reported by Captain Cook. No later investigations and enquiries have, however, in any way established the correctness of this hypothesis, those explorers who have made a special study of the dialects and habits of the aboriginal inhabitants entirely failing to elicit anything even remotely coinciding with the name in question. It has, in fact, been reluctantly concluded by one of the most experienced Queensland authorities on these matters that the name originated as a mere miscomprehension of the information elicited from the natives. Verbal communication with the native tribes under the most favourable circumstances is liable to a vast amount of misunderstanding, and where other than linguistic experts are present it frequently happens that much mongrel or "pidgin English" gets mixed up with the native terms. Assuming this to have been the case in the present instance, it has been suggested that the name of Kangaroo, or "Kanguroo," as it was originally spelt, implied some form of negation of the knowledge which the enquiring white man was seeking to elicit, or, maybe, partly even a phonetic and parrot-like repetition of the constantly recurring query that was doubtless current among the "handy men" of the *Endeavour's* commission, such as "Can you" tell me this or that concerning the many unfamiliar objects that greeted the eyes of the new arrivals in this strange land. The writer retains a vivid recollection of a closely analogous manner in which the rural inhabitants of Vigo Bay, on the Spanish coast, appropriated a common phrase used by the crew of the yacht with whom he landed there. Having evidently noted that the two words "I say" prefaced the majority of Jack-tar's speeches, this catch-phrase was adopted and applied by them as a greeting and as a reply to almost every interrogation in dumb-show or otherwise that was addressed to them. An unknown animal submitted to these rustic Solons would doubtless have been dubbed the "I say"; and had the land been a new one — say, somewhere in the South Seas — that name would probably have stuck to it. Applying this interpretation to the kangaroo, and bearing in mind the fondness of the Australian native to duplicate his name-words or syllables — e. g. *wagga-wagga*, *debil-debil*, and so forth — the "Kang-you-you" or a closely resembling phonetic expression would present itself to the native mind as a much more correct rendering of the simpler "Can you" or "Kang you" which he had picked up as a catch-phrase from the *Endeavour's* crew. In the absence, at all events, of any more rational interpretation of the mystery, this one would seem to merit consideration.

While the kangaroo is being speedily dethroned from the dominant position it originally occupied in the indigenous Australian fauna, praiseworthy and highly successful attempts have been made to acclimatise this marsupial in one of the English Parks, Woburn Abbey, and elsewhere, where troops of these graceful creatures may be seen under conditions of happiness and liberty scarcely inferior to those by which they are environed in their native "bush."

Of smaller members of the Kangaroo Family, there are some thirty distinct forms, popularly known in Australia as WALLABIES, WALLAROOS, PADDY-MELONS, POTOROOS, KANGAROO-HARES, KANGAROO-RATS, etc. The wallabies, which represent the most important group with regard to their larger size and economic utility, number some fourteen or fifteen species, and are distinguished, with relation more especially to their habitats or peculiar structure, as ROCK-, BRUSH-TAIL, and SPUR-TAIL WALLABIES, etc. Among the rock-wallabies the yellow footed species from South Australia is undoubtedly one of the handsomest as well as the largest member of its group, the uniform grey characteristic of the majority of its members being in this instance represented by an elegantly striped and banded form, in which the several tints of brown, yellow, black, and white are pleasingly interblended. The successful stalking of rock-wallabies in their native fastnesses entails no mean amount of patience and agility. Although these animals are so abundant in favoured localities as to make hard-beaten tracks to and fro betwixt their rock-dwellings and their pasture-grounds, one may traverse the country in broad daylight without catching a glimpse of a single individual. One species, about the size of a large rabbit, is very plentiful among the rocky bastion-like hills that border the Ord River, which flows into Cambridge Gulf, in Western Australia. Efforts to stalk examples in broad daylight proved fruitless; but by sallying out a little before daybreak, so as to arrive at their feeding-grounds while the light was still dim, the writer succeeded in securing several specimens. Many of these rock-wallabies are notable for the length, fine texture, and pleasing tints of their fur, their skins on such account being highly esteemed for the composition of carriage-rugs and other furry articles.

Photo by D. Le Souef [*Melbourne*

TREE-KANGAROOS

Examples acclimatised in the Melbourne Zoological Gardens

Of the larger brush or scrub varieties, the species known as the BLACK WALLABY is the most familiar form. It is particularly abundant in the Southern Australian States, and also in Tasmania. Its flesh is excellent eating, and, dressed and served up in the orthodox manner of jugged hare, can scarcely be distinguished from that toothsome dish. Some of the smaller species, such as the hare- and rat-kangaroos or potoroos, are, as their names denote, of no larger dimensions than the familiar rodents from which they are popularly named. Several of these smaller species, including notably the potoroo, or kangaroo-rat of New South Wales, are addicted to paying marked attention to the settlers' gardens, and, being to a large extent root-feeders, have acquired a special predi

Photo by York & Son [*Notting Hill*

GAIMARD'S RAT-KANGAROO

A species named after the French naturalist, Gaimard

lection for the newly planted or more fully matured potato crops.

The most abnormal group of the Kangaroo Family is undoubtedly that of the TREE-KANGAROOS, formerly supposed to have been limited in its distribution to the island of New Guinea, but which has within recent years been found to be represented by one or more species in Northern Queensland. At the Melbourne Zoo they have been found, except in the coldest weather, to thrive well in the open — a moderate-sized tree, with a small fenced-in enclosure around it, being admirably suited to their requirements, at the same time providing a most instructive exhibition of their peculiar forms and idiosyncrasies. Seen at its best, however, the tree-kangaroo, or "boongarry," as it is known amongst the Queensland natives, is a most clumsy, melancholy-looking beast, which has apparently found itself "up a tree," not as the outcome of its personal predilections, but owing to the *force majeure* of untoward pressure in the form either of relentlessly persecuting enemies or the failure of its normal terrestrial commissariat. Compared with the graceful and superlatively agile tree-frequenting phalangers, between whom and the ordinary kangaroos it has been sometimes, but erroneously, regarded as representing a connecting-link, the boongarry presents a most ungainly contrast. Its climbing powers are of the slowest and most awkward description, the whole of its energies being concentrated on its endeavour to preserve its balance and to retain a tight hold upon the branches of the trees it frequents, and to which it clings with such tenacity with its long sharp claws that it can with difficulty be detached. In its wild state, moreover, these claws can be very effectively used as weapons of defence; and hence the natives, with whom the animal is highly esteemed as an article of food, are careful to give it its quietus with their clubs or waddies before venturing to handle it. The tree-kangaroos inhabit the densest parts of the forests or "scrubs" of New Guinea and tropical Queensland, and appear to confine their movements chiefly to the trees of moderate size, or the lower branches only of the taller ones.

The species which constitutes the most natural known connecting-link between the typical Kangaroos and the family of the Phalangers, next described, is the FIVE-TOED RAT-KANGAROO, or POTOROO. As its name implies, it is a small creature of rat-like aspect and dimensions, and possesses, like a rat, a long, cylindrical, naked, scaly tail. It is the structure of the feet, however, that constitutes the important distinction. In place of the four toes only to the hind limbs it possesses the full complement of five, and the first toe, moreover, is set farther back, and is opposable for grasping purposes. This animal is from Queensland.

Photo by W. Saville-Kent, F.Z.S.

RAT-KANGAROO FROM NEW SOUTH WALES

One of the small jerboa-like species

The Phalangers

The Phalanger Family of Marsupials, which next invites attention, is constituted of animals especially adapted to lead an arboreal life, though among themselves they exhibit very considerable structural variations. The species usually placed at the head of this group is the essentially droll and in many respects abnormal form known as the Koala, or Australian Native Bear. Its little podgy tailless body, short thick-set head, and round tufted ears lend some countenance perhaps to the ursine analogy; but there the likeness ends.

Photo by W. Saville-Kent, F.Z.S.

KOALA, OR AUSTRALIAN NATIVE BEAR AND CUB

An excellent illustration of the way in which the female koalas carry their young securely perched on their backs

The koala is limited in its distribution to the south-eastern region of the Australian Continent, and is there found inhabiting the loftiest gum-trees, on the leaves and flowers of which it almost exclusively feeds. Compared with the opossum and squirrel-like phalangers, the koala is a very slow and sedentary little animal, remaining stationary in and browsing upon the leaves of the same gum-tree for days or even weeks at a stretch. Taking advantage of this home-staying propensity, examples are established, with full liberty to wander at will among the large gum trees, in the Melbourne Zoological Gardens, and have never abused the confidence reposed in them by surreptitiously absconding. The young koalas in particular make the most droll and delightful of household pets, speedily becoming attached to and following their owners about the premises, or contentedly settling down to the possession of an allotted corner of the verandah, in which an improvised perch has been erected and a constant supply of its favourite gum-leaves is daily assured. One such example, kept in Brisbane, Queensland, furnished the writer with the material for the photograph on this page; also of another one that illustrated in an interesting manner the very singular attitude assumed by the animal when asleep. Instead of creeping into the hollow trunk or spout of a gum or other tree, as the opossums and other phalangers are wont to do, the little "bear" simply sticks tight to his supporting branch, and, tucking in his head and ears and limbs, converts himself into an apparently homogeneous rounded mass of fur or moss, and, thus disguised, peacefully sleeps. Seen at some little distance, in fact, none but a trained eye could distinguish this sleeping bear from one of the round woody excrescences or bunches of mistletoe-like parasitic growths that are of common occurrence on the trees in every gum forest. In this way the little creature secures immunity from the

Photo by W. Saville-Kent, F.Z.S.

KOALA, OR AUSTRALIAN NATIVE BEAR

The koala has no tail, and is a stout, clumsily built animal, about 32 inches in length, with thick woolly fur of a greyish colour

attacks of enemies by mimicking the characteristic peculiarities of its environment, as obtains so generally among insects and other of the lower orders of animated nature. A closely analogous sleeping attitude, it may be mentioned, is assumed by one of the African lemurs or pottos, which have been dealt with in a previous chapter.

Although in captivity the koala takes kindly to a mixed diet in which bread-and-milk and fruit may form substantial elements, it can rarely be induced to altogether dispense with its customary gum-leaf regimen, and it is this circumstance that mainly accounts for its rarity in European menageries. Time and again, however, this interesting animal has put in an appearance at the Regent's Park; but in spite of Kew Gardens and other sources being laid under contribution for a supply of gum-tree leaves, its sojourn there has been but brief. As a matter of fact, the common or blue gum-tree, which is alone cultivated and available in any quantity in this country, and which is indigenous to Tasmania, is not the species on which the koala is accustomed to feed. Of gum-trees there are some hundred species, every one differing in the peculiarity of its aromatic scent and flavour, and having its special clientèle among the ranks of leaf-browsing animals. So far as the writer's observations extended, it was the big Queensland "white" and "swamp" gums that were especially patronised by the Australian bears, and these are not grown in England.

Although at first sight, and normally so far as the younger individuals are concerned, the koala would appear to represent the most perfect embodiment of peace and goodwill among mammals, he is accredited at a maturer age, when crossed in love or goaded to resentment by some other cause, to give way to fits of ungovernable rage. These temporary lapses are, however, very transient, and our little friend soon recovers his customary bland placidity. While it is being threshed out, nevertheless, the "burden of song" delivered by rival claimants for a partner's favours is a remarkable phenomenon. The circumstance that the vocal duet is commonly executed high up among the branches of the loftiest gums no doubt adds very considerably to both the timbre of the "music" and the distance to which it is carried. The old-time phrase of "making the welkin ring" would undoubtedly have been applied with alacrity and singular appropriateness by the poets of the departed century to the love-song of the koala, had they been privileged to hear it.

Among the examples of the koala which have been in residence at the Zoo, one of them came to a pathetic end. As told to the writer by Mr. A. D. Bartlett, the late superintendent, it appears that the little animal, on exhibition in the gardens during the day, was brought into the house at night, and allowed the run of a room which, among other furniture, included a large swing looking-glass. One morning the little creature was found crushed to death beneath the mirror, upon which it had apparently climbed and over balanced. The information that the animal was a female evoked the suspicion that personal vanity and

Photo by W. Saville-Kent, F.Z.S.

KOALA, OR AUSTRALIAN NATIVE BEAR

These animals make a peculiarly plaintive cry when molested in any way by human beings

the admiration of its own image in the glass had some share in compassing its untimely end. Possibly, however, it hailed in the reflection the welcome advent of a companion to share its lone banishment from the land of the gum-tree, and in its efforts to greet it thus came to grief.

The female koala produces but one cub at a time. At an early period after its birth this is transferred to its mother's back, and is thus transported until its dimensions are about one-half of those of its parent. The pair as shown in the illustration on page 355 presents, under these conditions, an essentially grotesque aspect.

It is a noteworthy circumstance that, compared with the male, the female koala is but rarely to be observed wandering abroad during broad daylight. As with the typical phalangers food is consumed chiefly at night or during the brief Australian twilight hours. While the male at certain periods, more especially the months of March and April, is much in evidence in daytime to both the senses of sight and hearing, as attested to on a previous page, the female spends the whole or greater portion of the day clinging as an inert sleeping mass to a convenient branch. "Bear"-shooting in Australia, as might be anticipated from the description here given of the animal's habits and temperament, affords but sorry sport. It may further be remarked that those who have shot at and only disabled one of these inoffensive little creatures are scarcely likely to repeat the experiment. The cry of a wounded koala has been aptly compared to that of a distressed child, but still more pathetic. When fatally shot, it also more frequently than otherwise clings tenaciously back-downwards, like the South American sloths, to the supporting tree-branch, and is thus frequently irrecoverable. With the non-sentimental Australian furrier the koala's pelt of soft, crisp, ashy-grey fur is unfortunately in considerable demand, being made up mostly, with the quaint round head and tufted ears intact, into, it must be confessed, singularly attractive and warm rugs.

The correspondence of the koala in form and habits to the sloths among the higher mammalia has been previously mentioned. The parallelism might be pursued in yet another direction. In earlier times the small tree-inhabiting South American sloths were supplemented by ground-frequenting species, such as the Megatherium, which were of comparatively titanic proportions. The epoch of the accredited existence of these huge ground-sloths was so comparatively recent — the later tertiaries — that it is even yet not regarded as altogether improbable that some existing representative of the race may yet be discovered in the fastnesses of the South American forests, and thus claim a niche in the pages of a subsequent edition of "LIVING ANIMALS." In a like manner the little sloth-like tree-frequenting "Australian Bear" had his primeval ground-dwelling colossi, and there is yet a lurking hope among enthusiastic zoologists that some surviving scion of the little koala's doughty forebears may yet turn up in the practically unexplored Central Australian wildernesses. Some such anticipations, as a matter of fact, stimulated the hopes and aspirations of the participators in one of the latest of these exploring expeditions, which, while not successful in this instance in obtaining so great a prize, secured for science that most interesting and previously unknown marsupial mammal the Pouched Mole.

Photo by W. Saville-Kent, F.Z.S.

SQUIRREL-LIKE FLYING-PHALANGER OF VICTORIA

This animal has soft grey fur like that of the chinchilla

The Typical Phalangers

The typical PHALANGERS, or OPOSSUMS, as they are familiarly known throughout Australia, include a very considerable number of representatives, ranging in size from that of a small mouse to that of a full-grown cat. All are essentially arboreal in their habits, feeding principally on the leaves and flowers of the various gums. They are for the most part strictly nocturnal in their habits, and make their homes and retiring-places during the day in the hollow trunks and limbs that are of such abundant occurrence in the periodically fire-swept Australian forests. Almost all the larger species are notable for the length, thickness, and exquisitely fine texture of their fur, a circumstance for which they are consequently laid under heavy penalties for the sake of their pelts. The island colony of Tasmania, in the extreme south, with its colder climate, as might be anticipated, produces the finest qualities of these furs, that of the BLACK or SOOTY OPOSSUM, which is peculiar to the island, being most highly prized. The length and furry character of their in many instances prehensile tails also form a conspicuous feature of this group. Nature, in fact, apparently distributed caudal material so over-liberally among these marsupials that the little koala had to make shift without.

Photo by W. Saville-Kent, F.Z.S.

LARGER FLYING-PHALANGER

A nearly pure white example

The group of the Phalanger Family popularly known as FLYING-SQUIRRELS, or more correctly as FLYING-PHALANGERS, is almost universally admitted to include some of the most beautiful of living mammals. In external structure, so far as their peculiar so-called "flying" mechanism is concerned, these animals coincide in a remarkable manner with the true flying-squirrels, belonging to the Rodent Order, indigenous to the Asiatic and American Continents. In neither instance is there flight, in the true sense of the term, similar to that of birds and bats, but the fore and hind limbs are connected by a parachute-like membrane, which, outstretched when the animal leaps from tree to tree, buoys it up and enables its owner to traverse, in a straight and gradually descending line only, very considerable distances.

The smaller squirrel-like form common to the south-eastern districts of Australia, and on account of its predilection for sweets commonly known as the SUGAR-SQUIRREL, makes a most charming little pet. For the most part addicted to sleep, and impatient at being disturbed during the day, towards sundown it wakes up, and is full of frolic. One such example was the writer's traveling companion for a considerable interval in Western Australia. While remaining packed conveniently away in a small box throughout the day, it was accustomed to enjoy the liberty of whatever apartment its owner occupied in the evening and throughout the night, returning of its own accord to its sleeping-box with the approach of dawn. On one exceptional occasion, however, Master Tiny, as this individual was named, was missing in the morning from his accustomed crib, and a prolonged search and examination of every

corner and article of furniture that could afford shelter failed to recover him. That the little creature was lost through some one having unwittingly left the door of the apartment open, permitting its escape, was the only and much deplored conclusion that could be arrived at. Towards evening, however, there was a slight rustle close at hand, and Master Tiny was discovered emerging, like Minerva from the head of Jupiter, from the top of one of the old-fashioned china dogs that decorated the hotel room mantelpiece. The ornament, seemingly intact from the front, had the back of the head battered in. Through the resulting crevice the little animal had managed to squeeze itself, having come to the conclusion, doubtless, that this newly chosen retreat more nearly resembled the cavernous shelter of its native tree-spout than its accustomed artificially constructed box. This singular domicile Master Tiny was permitted to monopolise for the remainder of his sojourn at that hostelry. One of the favourite diversions of this little phalanger during the evenings was to climb up the curtain and cornice of the room he occupied, and thence hurl himself through the air with outspread parachute to the writer at the opposite end. The apartment, happening to be the commercial room of the hotel, some thirty feet in length, gave him good scope for exercising his characteristic flying leaps. The attitude invariably maintained during these flights is aptly illustrated in the accompanying photograph; the body is never poised with the head inclined downwards, as is commonly depicted in artists' fancy sketches of the animal contained in popular natural histories. A friend of the writer's in Tasmania, who kept one of these flying-phalangers as a household pet, was accustomed to leave a crevice of the window open at night, so that the little fellow could go in and out as it liked. After the manner of most pets, however, a day arrived upon which its box was found vacant, a marauding cat or other disaster having apparently compassed its untimely end.

Photo by W. Saville-Kent, F.Z.S.

LESSER FLYING-PHALANGER

Illustrating position maintained during its remarkable flying leaps

Photo by W. Saville-Kent, F.Z.S.

PYGMY FLYING-PHALANGER

A life-size photograph. The hairs of the tail in this animal are arranged in two parallel lines, like the vanes of a bird's feather

The larger flying-phalanger, the dimensions of our domestic tabby, and with fur as long and as soft as the Persian variety, is less frequently domesticated. It has, in fact, an evil reputation for scratching, biting, and general untamableness. One that was kept for some little time by the late Dr. Bennett, of Sydney, and brought to England, never entirely lost its innate savagery. On the voyage from Australia it became sufficiently tame as to be allowed occasionally to run about on the deck, and was so far amiable as to lay on its back and permit itself to be tickled. On attempting to handle it, however, "it displayed its usual savage disposition, digging its sharp claws and teeth into the hands of its captor." The writer was fortunate in being the recipient in Queensland of a couple of these large phalangers which were exceptions to the usual rule. These specimens—a mother and its young male offspring—also varied in colour from normal examples, which are usually dark slate or blackish brown above and whitish underneath. The mother in this instance was a beautiful cream-white throughout; and her young one, while dark chinchilla-grey upon the back, limbs, and tail, had white ears and breast. Both were very friendly, and would of their own accord climb over their owner's person, seeking in his pockets for hidden lumps of sugar and other acceptable dainties. As with the smaller squirrel-like forms, they slept throughout the greater portion of the day, waking to activity and making excursions in search of their food as soon as the sun went down. The tail of this species of phalanger is abnormally long and furry, but not prehensile. It was observed of them that when feeding leisurely on the gum-tree leaves this appendage was permitted to hang or rest loosely, but that when walking along the branches they would very frequently coil this member into a tight spiral coil, like a watch-spring or the proboscis of a butterfly, against their hindquarters. This phenomenon is apparently unique among mammals. Although generally seeking the darker retreat of their box for their long daylight sleep, the female, more particularly, would frequently simply curl herself

Photo by W. Saville-Kent, F.Z.S.

COMMON GREY OPOSSUM, OR PHALANGER

The fur of this species is in great demand for the manufacture of carriage-rugs

up into a furry white ball in one corner of the cage, the head, limbs, or other features being at such times altogether indistinguishable. The aid of the magnesium flash-light was successfully called into service to secure the photographic likeness of this animal, here reproduced, which was taken while it was enjoying its evening meal.

As previously mentioned, some representatives of the flying-phalanger group are no larger than mice, and are furnished in a similar manner with a parachute-like membrane that enables them to take abnormally long flying leaps, or as it were to sail horizontally through the air. The PYGMY FLYING-PHALANGER, whose length of body does not exceed 2½ inches, is one of the most interesting. The tail in this form is also adapted for aerial flotation, the long hairs that grow upon this appendage being arranged in two parallel lines like the vanes of a feather. Its distribution is limited to the south and eastern districts of the Australian Continent. There are also a number of mouse- and squirrel-like phalangers destitute of the flying-membrane, which in this respect very closely resemble in external aspect more typical members of the Rodent Order. One form in particular, the STRIPED PHALANGER of New Guinea, decorated with broad longitudinal black and white stripes, is singularly suggestive of some of the variously striped American squirrels. This interesting island of New Guinea also produces a little PYGMY PHALANGER with a feather-like tail which, except for the absence of a parachute or flying-membrane, is the very counterpart of the Australian kind. Another species, which in shape, size, and more especially with reference to its long, pointed snout, closely resembles a shrew-mouse, is found in Western Australia. The tail of this species, known as the LONG-SNOUTED PHALANGER, is highly prehensile; and it is also provided with a long, slender, protrusile tongue, with which it abstracts the honey from Banksias and other flowers, upon which it customarily feeds.

The two large phalangers known as the BLACK and GREY or VULPINE OPOSSUMS, which are chiefly laid under contribution for the Australian fur supplies, are provided with prehensile tails, the under side of the extremity of which grasps the supporting fulcrum and is devoid of hair. The adaptation of the tail for use as a fifth hand — as in the New World monkeys — is, however, much more conspicuously manifested in what are known to the colonists as the RING-TAILED OPOSSUMS, and to zoologists as CRESCENT-TOOTHED PHALANGERS. In these the tail tapers to a fine point, and the hair throughout the terminal third of this appendage is so fine and short that it at first sight presents the appearance of being entirely naked. This terminal third of the tail, moreover, in the greater number of species, contrasts with the remaining portion by being white in hue. It occasionally happens, however, that individuals occur which are entirely white. One such which came into the writer's possession was obtained from the Bruni Islands, in the Derwent Estuary, Tasmania, and afterwards became a great pet with the young people at Government House, Hobart. It is an interesting circumstance that the Bruni Islands were noted for the production of albino animals of various descriptions, white kangaroos and white emus having also been obtained from this locality. Probably some peculiarity of the soil, and its action on the vegetable food the animals

Photo by Henry King, [Sydney

AUSTRALIAN GREY OPOSSUM, OR PHALANGER

On account of its "foxy" appearance, this species is also known as the Vulpine Phalanger

Photo by W. Saville-Kent, F. Z. S.

FRONT VIEW OF GREY OPOSSUM, OR PHALANGER

Displays the bare under-surface of the prehensile tail

consumed, played an important part in the unusually frequent occurrence of this phenomenon.

The ring-tailed opossums differ essentially from the common opossum or phalanger and its allies in their life habits. While these latter habitually take up their abode and bring forth their young in hollow trees, the ring-tailed species construct a regular nest of interlaced sticks, leaves, grass, or any other available material for their domicile. The structure much resembles the nest, or "drey," of our own familiar squirrel, and may be perched high up among the tree branches or within only a few feet from the ground among the scrub thickets. In New Guinea a variety of these ring-tailed phalangers occurs, not found in Australia, which has no white tip to its tail, and the ears are very short and wide. The group as represented by this species leads to the consideration of the so-called CUSCUSES or typical phalangers indigenous to New Guinea and North Queensland, though but rarely seen there, which, as an exception to the Marsupial Tribe, are distributed among the Indo-Malay Islands as far westward as Celebes. In the cuscuses the tail is altogether naked, and pre-eminently prehensile throughout almost its entire terminal moiety ; the ears are round and, proportionately, exceedingly small; while the fur is very short, thick, and woolly. Compared with the opossums or phalangers, the cuscuses are very dull and sluggish in their movements, creeping slowly among the branches of the trees to browse on the fruit and leaves which constitute their principal diet. Like the opossums, however, or even to a greater extent, they vary this vegetarian regimen with insects or an occasionally captured bird.

Photo by W. Saville-Kent, F.Z.S

PROFILE VIEW OF GREY OPOSSUM, OR PHALANGER

The opossums are usually shot by moonlight, as seen silhouetted against the sky

THE CUSCUSES

The familiar SPOTTED CUSCUS of New Guinea is the most ornate marsupial mammal. The males, more especially, are as variegated in colour as a tortoiseshell cat, their tints, moreover, closely corresponding in hue with those of the feline. No two individuals, however, are precisely alike in this respect. Usually the ground-colour of the

back is a dirty or creamy white, interspersed with various-shaped blotches of nut-brown or black; the chin, breast, and under-parts are a purer white, and the limbs grey or reddish brown, or, as shown in the photograph over-leaf, mottled like the body. The BLACK CUSCUS of Celebes is, as its name denotes, a much more sombre-looking animal, and is also the largest species, its dimensions equalling or exceeding those of a large cat. The uniformly tinted GREY CUSCUS of Timor, Amboina, and other of the Indo-Malay Islands is very similar in size and aspect, excepting for the half-naked tail, to the common ring-tailed phalanger. All the cuscuses are of rare occurrence in even their most favoured habitats. On one occasion the writer came across an example of the grey species in the scrub forest of Thursday Island, Torres Straits. In this instance, however, it is doubtful if the animal was not an escaped pet brought over from the neighbouring coast of New Guinea.

By permission of S. Sinclair, Esq. [*Sydney*

RING-TAILED OPOSSUM, OR PHALANGER, AND NEST

This is the only Australian opossum which builds a regular nest

Much interesting information concerning different varieties of the cuscus is contained in Dr. Alfred Wallace's interesting work "The Malay Archipelago." An anecdote of one which was brought to this naturalist during his residence in the Aru Islands — the headquarters of the great bird of paradise — is thus related: "Just as we had cleared away and packed up for the night, a strange beast was brought, which had been shot by the natives. It resembled in size and in its white woolly covering a small fat lamb, but had short legs, hand-like feet with large claws, and a long prehensile tail. It was a Spotted Cuscus, one of the curious marsupial animals of the Papuan region, and I was very desirous to obtain the skin. The owners, however, said they wanted to eat it; and though I offered them a good price, and promised to give them all the meat, there was great hesitation. Suspecting the reason, I offered, though it was night, to set to work immediately, and get out the body for them, to which they agreed. The creature was much hacked about, and the two hind feet almost cut off, but it was the largest and finest

Photo by W. Saville-Kent, F.Z.S. [*Croydon*

SPOTTED CUSCUS

The cuscuses are sleepy animals, with soft, woolly fur, which in this species is curiously variegated in colour

specimen of the kind I had seen; and after an hour's hard work I handed over the body to the owners, who immediately cut it up and roasted it for supper."

The remarkable tenacity of life possessed by the cuscus is fully attested to by Dr. Wallace. He says: "They move about slowly, and are most difficult to kill, owing to the thickness of their skins and tenacity of life. A heavy charge of shot will often lodge in the skin and do them no harm, and even breaking the spine or piercing the brain will not kill them for some hours. The natives everywhere eat their flesh; and as their motions are so slow, easily catch them by climbing; so that it is wonderful that they have not been exterminated. It may be, however, that their dense woolly fur protects them from birds of prey, and the islands they live in are too thinly inhabited for man to be able to exterminate them."

One of the most notable circumstances respecting the cuscus is the fact that it is one of the few marsupials whose geographical distribution extends so far east in the Malay Archipelago as to be found associated with many of the higher mammalia which are altogether unrepresented in Australia or New Guinea. The Moluccas, including notably the islands of Silolo, Ceram, Boru, and many smaller ones, for example, produce no less than three species of cuscus, and are also the home of a species of baboon, a civet-cat, a deer, and that remarkable pig the babirusa. One other marsupial, a little flying-phalanger, is likewise a denizen of these islands. It has been suggested by Dr. Wallace that none of the foregoing higher mammals are possibly indigenous to the Moluccas. The baboon, he remarks, is only found in the island of Batchian, and seems to be much out of place there. It probably originated from some individuals which escaped from confinement, these and similar animals being often kept as pets by the Malay inhabitants and carried about in their praus. The civet-cat, which is more common in the Philippines and throughout the Indo-Malay region, is also carried about in cages from one island to another, and not infrequently liberated after the civet has been abstracted from them. The deer, which is likewise tamed and petted, its flesh also being much esteemed for food, might very naturally have been brought by the Malays from Java with the express object of its acclimatisation. The babirusa, whose headquarters are in the island of Celebes, is only found in Boru, its nearest neighbour in the Moluccan group. Dr. Wallace anticipates that these two islands were in former times more closely connected by land, and that under such conditions the babirusa may have swum across the intervening channel. Should these several hypotheses be correct, the Molucca Islands must not be regarded, from a zoological standpoint, as an essentially Australasian or marsupial-producing region.

The Wombats

The Wombat Family, claiming the next position in the marsupial galaxy, constitutes the very antithesis to the light and graceful arboreal phalangers. There are but three known species, one of these inhabiting Tasmania and the adjacent islands, while the other two are peculiar to the southern region of the Australian Continent. In forms and gait their thick-set tailless bodies suggest a cross between a small bear and a capybara, and as "bears" and "badgers"

they are familiarly known by the Australian colonists. The badger simile is perhaps the most pertinently applied with reference to their habit of excavating huge earth-burrows as dwelling-places, and out of which they customarily emerge only at night to feed. The TASMANIAN WOMBAT, at all events, is essentially gregarious in its habits. In the neighbourhood of Swansea, on the east coast, it is, or was, particularly abundant, forming regular warrens among a light undergrowth of vegetation, through which traveling on horseback is a distinctly risky proceeding. The temperament of the wombat is peculiarly placid; and hence, as it might be anticipated, they are essentially long-lived. One, Charlie by name, which has been domiciled at the Zoo for the past thirty years, is still hale and hearty, and evidently disinclined yet awhile to immolate himself on the altar of fame as a much-needed successor to the antique effigy which has for so long represented his species in the British Natural History Museum. Waiting for dead men's shoes is a proverbially tedious task, and for a coveted wombat's skin evidently more so.

The tough hide, with its thick, harsh fur, of the Tasmanian wombat, or "badger," as it is locally dubbed, is somewhat highly prized in the land of its birth. For floor- and door-mats and rugs the pelt is practically indestructible; and as such, though scarcely a thing of beauty, the special pride of the thrifty housewife. This animal is also not infrequently made a household pet, and will waddle as complacently as an over-fed poodle around the premises after its owner. The wombat, like the large majority of the marsupial animals, is for the most part nocturnal in habits, and a strict vegetarian.

The wombats present several interestingly distinct structural peculiarities. In the first place, their teeth, which are twenty-four in number, all grow uninterruptedly throughout life, and are consequently devoid of roots. The incisor teeth are represented by but a single pair in each jaw, and, having enamel only on their front surfaces, wear away in a chisel-like form, as in the beavers and other rodents. Superficially in both form and habits, as well as in the character of their dentition, the wombats may in fact be aptly likened to some unwieldy representative of the Rodent Order. Another structural peculiarity of the wombat is that it is the proud possessor of two more pairs of ribs than any other marsupial.

Of the three known species, the COMMON WOMBAT of the South and Eastern Australian States is the largest, attaining to a length of as much as 3 feet. The colour of this form is subject to considerable variation, being sometimes yellow, yellow more or less mixed with black, or completely black. Albinism, as in the kangaroos and phalangers, is of apparently rare occurrence. The hair, while coarse, is less so than in the Tasmanian species. What is known as the HAIRY-NOSED WOMBAT, inhabiting South Australia, is intermediate in size between the common and the Tasmanian varieties;

Photo by E. Landor

COMMON WOMBAT

A burrowing animal about the size of a small pig

its most distinctive features are the soft and silky character of its brownish hair, and its longer and more pointed ears. The coarseness of the hair of the Tasmanian species has been previously referred to; in colour it is most usually a dark greyish brown, while the ears are small and rounded.

The flesh of the wombat is somewhat esteemed for food, being regarded by some as equal to pork, and much resembling it in flavour. The predilection of tame specimens for milk is very strong, and it has been recorded of one animal that it was not only in the habit of seeking out the milk-pans and pushing off the covers in order to drink the contents, but afterwards of taking a bath in what was left.

A remarkable habit has been accredited to the wombat which invites scientific investigation. It is said to be capable of sustaining life for an abnormally long period under water, and that when in the course of its travels it meets with a pond or river it does not attempt to swim, but, deliberately entering the water, walks along the bottom, and so emerges on the opposite bank.

Photo by E. Landor

HAIRY-NOSED WOMBAT

A form peculiar to South Australia

The animals of Australia living in not very remote geological times included a near ally of the wombat which equalled a tapir in dimensions.

The Bandicoots

The Australian Bandicoots—not to be confounded with their namesake of India, which is a big rat — constitute a very distinct little family group. They number in all some eight or nine species, distributed throughout the length and breadth of Australia and Tasmania, and found also in New Guinea. The largest member is about the size of a rabbit; and as its general shape, long ears, and soft silky hair impart some slight resemblance to that rodent, it is commonly known as the Rabbit-Bandicoot. With the above-enumerated points, however, the likeness ceases — its possession of a moderately long tail, pointed snout, and feet modified on a plan closely resembling those of the kangaroo's indicating its essentially distinct nature. In a second variety, having somewhat the same external contour, but smaller in size, the fore limbs are very short, and the feet so modified that only two toes are visible externally. With reference to this peculiar feature, it is known as the Pig-footed Bandicoot. In a third kind of similar dimensions, with harsh brown fur, the ears are comparatively short, and the snout is so abnormally prolonged that it has been appropriately named the Long-nosed Bandicoot. Superficially, in point of fact, this and other allied species so closely resemble certain of the long-snouted insectivorous mammals, such as the Tenrec and Solenodon, that they might be excusably mistaken by the non-scientific for members of the same group. The bandicoots are chiefly nocturnal, and at all events incorrigible "sun-downers," turning up for their meals when the evening shadows fall, and taking a heavy and unwelcome toll of the farmers' potatoes, beets, or other root crops. Like the wombat, already described, they are earth-burrowers. Some of them, however, construct nests above-ground in long coarse grass or low tangled shrubs, which are so ingeniously built in accord with their environment as to readily escape detection.

Photo by G. W. Wilson & Co., Ltd.

COMMON WOMBAT

The Wombats may be said to hold the place occupied in other parts of the world by the Badgers

Insects and worms, in addition to a main diet of vegetable matter, contribute to the bandicoot's somewhat heterogeneous menu.

The wood- and root-boring larvæ of a moth which infests the Australian wattle- or acacia-trees are a very favourite food with several of the species, and it is worthy of remark that the bandicoots are not alone in displaying a penchant for this delicacy. Under the title of "bardies" they are collected and highly esteemed for food by the natives of Western Australia, who eat them either cooked or raw. These larvæ are, moreover, acceptable to many European palates, and the writer has witnessed little faggot-like bundles of them brought round by the natives to the hotels at Geraldton, Western Australia, for sale or barter to chance customers. It may be observed in this connection that the analogous wood-boring larvæ of the goat-moth, which were kept and specially fattened for the occasion, constituted one of the dainty dishes of the luxurious Romans.

One of the commonest species found in Tasmania is known as the BANDED or STRIPED-BACKED BANDICOOT, being so named on account of the characteristic markings of its fur. The general ground-colour of the coat is an almost equal admixture of black and yellow hairs, the black tint, however, prevailing on the back, and the lighter one on the sides. The hind-quarters are, however, variegated by the presence of some three or four broad transverse stripes that are almost entirely black, while the intervening spaces are a light whitish yellow. A few shorter stripes are sometimes continued as far as the root of the tail, this appendage also having a dark line running along its upper surface. The head is of a somewhat lighter tint than the remainder of the body, while the breast, abdomen, and feet are white, slightly tinged with grey. The transversely striped pattern of ornamentation of the hindquarters of this bandicoot is of interest with relation to the circumstance that a similarly located banded variegation of the fur occurs also in the Tasmanian wolf, or thylacine, and in the banded ant-eater, described in a following section. As a colour-pattern it would appear to be quite peculiar to these marsupials, no such restriction of the markings occurring among the higher or placental mammals. In the South African suricate, a member of the Ichneumon Tribe, in which the nearest approach to this dorsal banding is met with, the stripes are equally developed as far forward as the base of the neck.

Both the banded and other species of bandicoots are extremely swift and active in their movements, and are at the same time noted for the singularity of their gait. This consists of a half-running and half-jumping action, induced by the peculiar structure of their feet and greater length of the hind legs, which are modified on a plan intermediate between that of the kangaroos and the dasyures, or native cats. The back of the animal while running being highly arched, adds to the grotesqueness of its appearance. Like the native cats, the pouch in the bandicoots opens backwards; it is furnished with eight teats, but not more than two young are usually produced at a birth.

Photo by W. Saville-Kent, F.Z.S.

LONG-NOSED AUSTRALIAN BANDICOOT

Bandicoots, although larger, have somewhat the appearance of shrews

The striped-backed bandicoot is not infrequently adopted as a household pet, in spite of its notorious garden depredations. When thus domesticated, it appears to be capable of developing a strong attachment for its owner. One that was owned by friends of the writer especially attached itself to the lady of the house. It was acquired when quite young, having escaped from the pouch of an adult

female which the dogs had killed, and being then about the size of a mouse. It speedily learned to lap milk, and throve on a diet of bread and raw potato. As it grew larger it was allowed the run of the house, and also of the garden, but habitually returned to the sleeping-quarters selected by itself, and represented by the woolly depths of its mistress's work-basket. In this haven of rest it slept all day, scolding and snapping at any intruding hand. Towards dusk it would waken up and bustle about in a most energetic manner, with the air, in fact, of having an immense amount of business to transact within the very shortest limits of time. Its first dart was always towards a corner where a supper of bread-and-milk and potato was usually placed. This meal discussed, its evening's occupation commenced of scampering around the room and over every accessible article of furniture. Nor was it shy of climbing up and resting for a few seconds on the shoulders of its human friends, being always, however, in too great a hurry to prolong the visit. Finally, as with all pets, "Coota," as he was familiarly named, came to an untimely end — not a cat, however, on this occasion, but, if rumour whispers true, through over-indulgence in a too liberally furnished meal of custard pudding.

Photo by W. Saville-Kent, F.Z.S.

RABBIT-BANDICOOT

The largest of the bandicoots; about the size of a rabbit

The flesh of this and other species of bandicoots is esteemed for food both by the natives and the white settlers in Australia. It is noteworthy of the banded variety, more especially, that the skin adheres so tightly to the flesh that its removal is a matter of some considerable difficulty. When full grown, this species measures as much as 18 inches in total length, and is little inferior to a rabbit with regard to the amount of good meat it provides for the larder.

The Pouched Mole

A still more essentially insectivorous marsupial is represented by the little mammal discovered only a few years since in the wild sandy wastes of Central Australia. In form and habits it so nearly resembles the familiar European mole that the title of the Pouched Mole has been very suitably given to it. At the same time, with regard to its remarkable organisation, it constitutes the sole representative of its peculiar family group. The first suspicions of the existence of this singular little animal were raised by the observation of peculiar sinuous three-lined tracks at irregular intervals on the surface of the sandy regions it inhabits.

After a long quest, with the aid of the aborigines, the first specimen was discovered reposing under a tuft of coarse porcupine-grass. A further investigation elicited the fact that its burrowing proclivities were much less pronounced than those of the ordinary moles, the little creature progressing alternately over the surface of the sand, and then ploughing its way, for several feet or yards, two or three inches only beneath the surface. All efforts to preserve examples of this marsupial alive for longer periods than three or four days proved abortive; for though the remains of ants and other insects were found within its viscera, it refused to feed upon the living supplies that were provided for it. In fact, the animal itself apparently ran the greater risk of being eaten.

Photo by A. S. Rudland & Sons

POUCHED MOLE

This animal is of a pale golden-red colour, and about 5 inches long. It spends most of its time burrowing, which it can do with great rapidity, in the sand of the Australian deserts in search of insects

Photo by W. Saville-Kent, F.Z.S.

UNDER SURFACE OF POUCHED MOLE

Notice the abnormal size of the third and fourth toes of the fore limbs, and their peculiar scoop-like shape

The colour of the pouched mole is for the most part light fawn, varying in parts to golden yellow. One of its most conspicuous features, as illustrated in the accompanying photographs, is the abnormal size of the third and fourth toes of the fore limbs, their peculiar scoop-like character proving of eminent service to the animal in its customary sand-burrowing habits.

The Tasmanian Wolf

The remaining family of the Australian marsupials constitutes a parallel to the carnivorous order of the higher mammalia, all its members being more or less flesh-eaters, and having their dentition modified with relation to such habits. One of these (the Tasmanian Wolf, or Tiger of the colonists, better known to zoologists as the Thylacine) is an animal of considerable size. Its dimensions equal those of a wolf or mastiff, with which the contour of its body and more especially that of the head very nearly correspond. In common with the true dogs, the thylacine hunts its prey by scent. This is well attested to by the following incident, as related by eye-witnesses. While camping out among the hills in Tasmania their attention was attracted very early one morning by a brush-kangaroo hopping past their fire in an evidently highly excited state. Some ten minutes later up cantered a she thylacine with her nose down exactly on the track, evidently following the scent, and in another quarter of an hour her two cubs came by also in the precise track. While not very swift, the Tasmanian "tigers" possess immense staying power, and will keep up a long, steady canter for many hours on end. Accustomed in its primitive state to run down and prey upon the kangaroos, wallabies, and other weaker marsupial mammals indigenous to the regions it inhabits, the Tasmanian wolf speedily acquired a predilection for the imported flocks of the settlers, and proved almost as destructive to them as its Old World namesake. To check its ravages, a price was put upon its head by the Tasmanian Government; and this measure, in conjunction with the rapid advances towards the complete settlement of the country which have been accomplished within later years, has compassed this animal's extermination in all but the wildest and

most inaccessible mountain districts. The colour-markings of this animal are somewhat striking, the grey-brown tints which characterise the ground-hues of the body and limbs being varied by a series of dark bands traversing the buttocks, these being widest in this region, and continued forwards to the middle of the back. A somewhat similar cross-stripe pattern of ornamentation occurs in the relatively small member of the same family described later on as the Banded Ant-eater.

Photo by L. Medland, F.Z.S.

TASMANIAN WOLF

This photograph shows the great width of gape of this ferocious animal

Examples of the Tasmanian wolf have frequently been on view at the Regent's Park Gardens, a very fine young male specimen being at present located in the marsupial section. Within a few weeks of its arrival it was on excellent terms with its keeper, though, owing to its somewhat imperfect sense of vision during the daytime, it was apt to snap somewhat promiscuously at those attempting to cultivate its close acquaintanceship. That a bite from its formidable teeth is not to be lightly risked will be made abundantly apparent by a glance at the successful yawning pose photograph secured of this example by Mr. Medland, and here reproduced. Although the thylacine is at the present time entirely limited in its distribution to Tasmania, it occurs in the fossil state on the Australian mainland; while, singularly to relate, the remains of a closely allied form have within recent years been unearthed in Patagonia. This circumstance, taken in conjunction with the fact that many other fossil types with Australian and New Zealand affinities have been discovered in the same South American strata, has strengthened the supposition maintained by many zoologists that in bygone ages a vast Antarctic continent, spreading through the areas now occupied by the Southern Indian and Pacific Oceans, temporarily united the now distinct lands of South America and Australasia.

The Tasmanian Devil

Next in size to the thylacine, but possessing a more unenviable notoriety for the uncompromising sulkiness and savagery of its disposition, is the animal which, in virtue of the aforesaid qualities, is known by the title of the Tasmanian Devil. In shape and dimensions this marsupial carnivore somewhat resembles a badger; but the head is abnormally large, the masseter muscles which control the action of the powerful jaws monopolising a very considerable share of the face area. The limbs are short and also very powerful, the front paws being well adapted to its burrowing habits. There is some slight variation in the colours of this marsupial Apollyon; and, as the

Photo by L. Medland, F.Z.S.

TASMANIAN WOLF

In this photograph are shown nearly all the chief characteristic points of the Tasmanian wolf

Photo by York & Son

TASMANIAN DEVIL

A small, but stout and powerful animal, very destructive, and absolutely untamable

aphorism runs concerning his sable namesake, he is not always so black as he is painted. More or less or in fact mostly black he always is, but there is usually a redeeming thread or patch of white upon his coat. This may take the form of a small star-like spot only on the front of its chest, which not infrequently extends to a narrow crescent-shaped band or line continued round the neck almost to the shoulders. One or more supplementary spots of white may also be developed upon the flanks and hindquarters.

The destructive propensities of the Tasmanian devil, wherein the farmers' sheep and poultry are concerned, are in no way inferior to those of the Tasmanian wolf, and in consequence of their former much greater abundance the havoc these animals committed was the more serious. Placed, like the last-named type, under Government ban, these native devils have, in comparison with the earlier days of colonisation, very considerably ceased from troubling, and with the ever-progressing march of settlement and civilisation will probably be altogether exterminated at a no very distant date. A bag of no less than 150 of these marauders, in the course of one winter, was recorded from an upland sheep-station some twenty or thirty years ago. In common with the thylacine, it has been observed that the Tasmanian devil has a marked predilection for prowling along the seashore in search apparently of crabs, fish, or any acceptable flotsam and jetsam that may be cast up by the waves.

Examples of this most unamiable of mammals were brought in alive on several occasions to the Hobart Museum during the writer's residence in Tasmania, but in all cases obstinately resisted every attempt towards the establishment of a friendly footing. Their ultimate relegation to the specimen-cases was, under the circumstances, unattended by any very poignant manifestations of regret. A fact brought into prominent notice during subsequent post-mortem investigations was the extraordinary extent to which these animals are infested with vermin. Possibly this circumstance is to a considerable extent accountable for the creature's unconquerable irritability. The experiment as to whether a course of disinfecting treatment, by baths or otherwise, would not conduce towards the taming of this native devil, where all other applied methods have failed, would at all events be worth the trial. The bath pure and simple is a wonderful soporific for unruly tempers. As most schoolboys know, a pail of water, from which the patient is withdrawn when a watery grave is apparently inevitable, is an unfailing specific for the taming of mice and other "small deer." The writer's experience with a villainously savage cat which one night fell incontinently into an uncovered cistern, and was rescued by him at almost the last gasp, will not be readily forgotten. That cat, though still a vixen to the ordinary members of the household, forthwith attached itself affectionately to its rescuer, and would sit for hours awaiting his arrival on the doorstep when the business of the day was over. Other fierce creatures, including the Tasmanian devil, would possibly prove amenable to the judicious application of the "water cure."

The Native Cats

The animals common in Tasmania and throughout the greater portion of the Australian Continent, and familiarly known as Spotted or Native Cats, and to zoologists as Dasyures, enjoy also an unenviable reputation for their depredations among the settlers' hen-roosts. To look at, these native cats are the most mild-mannered and inoffensive of creatures. Actually, however, they possess the most bloodthirsty proclivities, and may be aptly compared in their habits to the stoats, weasels, polecats, and other Old World carnivora. There are some five known species, the largest being equal to an ordinary cat in size, and the smaller ones about half these dimensions. All of them are distinguished by their spotted pattern of ornamentation, such spots being white or nearly so, and more or less abundantly sprinkled over a darker background which varies from light grey to chocolate-brown. In the commonest form, represented in the accompanying photograph, the ears and the under surface of the body are also often white. No two individuals, however, are to be found precisely alike in the pattern of their

By permission of S. Sinclair, Esq.] [*Sydney*

SPOTTED DASYURES, OR AUSTRALIAN NATIVE CATS

This species is rather smaller than an ordinary-sized cat. All the dasyures are arboreal in their habits, and very destructive to birds

markings. The dasyures differ from the two preceding types, the Tasmanian wolf and the devil, in being essentially arboreal in their habits, living by day and breeding, as the majority of the Australian opossums, in the hollow gum-tree trunks, from which they emerge at nightfall to seek their food. This, in their native state, when hen-roosts are not accessible, consists mainly of birds and such smaller marsupial forms as they can readily overpower.

The Pouched Mice

The so-called Pouched Mice represent a group of smaller-sized carnivorous mammals which have much in common with the dasyures, but are devoid of their spotted ornamentation. None of them exceed a rat in size. They number about twelve or fourteen known species, and are distributed throughout the greater part of Australia and New Guinea, and extend thence to the Aru Islands. They are said not to occur in the extreme north of the Australian Continent. The writer, however, obtained an example of the brush-tailed species,

Photo by W. Saville-Kent, F.Z.S.

BRUSH-TAILED POUCHED MOUSE, OR PHASCOGALE

A slender and graceful animal, the largest of the thirteen known species, and about the size of an ordinary cat

here illustrated, from the neighbourhood of Broome, in the farthest north or Kimberley district of Western Australia. This specimen, which was caught alive in a rat trap, exhibited astonishingly potent gnawing powers, almost succeeding one night in eating its way through the wooden box in which it was temporarily confined. The habits of this species are omnivorous, and chiefly akin to those of the ordinary rats, it being accustomed to prowl round the out-buildings at night, picking up any unconsidered trifles in the way of food that may be left unprotected.

Many of the smaller members of this tribe are no larger than mice ; and in one form, known as the JERBOA POUCHED MOUSE, inhabiting Queensland and New South Wales, the hind limbs are abnormally prolonged, and the animal progresses by leaps and bounds, after the fashion of the true jerboas, or its nearer relatives, the ordinary kangaroos and rat-kangaroos.

THE BANDED ANT-EATER

One of the most interesting from the zoologist's standpoint, and the last on our list of the Australian marsupials, is the little creature, limited in its habitat to Western Australia, locally known as the SQUIRREL. The BANDED ANT-EATER, with reference to its striped ornamentation and ant-eating habits, is the name by which it is usually chronicled in natural history works. In size and shape, except for its more pointed snout, its squirrel-like aspect is certainly somewhat striking. Like the true ant-eaters of the Edentate Mammalian Order, it, however, possesses a long protrusile tongue, with which it is accustomed in a similar manner to lick up the ants which constitute its main food-supply.

The most interesting biological peculiarity of this animal is the abnormal development of its teeth. These number as many as from fifty-two to fifty-six, and exceed the dental formula of any other known existing marsupial. The usual colour of this interesting little animal is a warm chestnut-brown, banded transversely over the back with white, these stripes being widest and most conspicuous over the hindquarters. This somewhat paradoxical marsupial possesses no pouch, the young, when first born and attached to the nipples in the manner characteristic of ordinary marsupials, being covered over and concealed among the longer hairs that clothe the abdominal region. In the dasyures, or native cats, previously described, the pouch exists only in a rudimentary condition, its function being fulfilled by merely a few skin-folds ; while in the "tiger" and native devil the pouch, contrary to that of the kangaroos, opens backwards.

In disposition the banded ant-eater presents a marked contrast to that of many of the preceding types. Caught in its native habitat, it does not attempt to bite, and soon becomes reconciled to captivity. The peculiar nature of its diet, however, militates against its being easily transported over-sea from the Antipodes.

The American Opossums

Photo by W. Saville-Kent, F.Z.S.

BANDED ANT-EATER

From an anatomical point of view, this is one of the most remarkable of the pouched mammals

The little group of the American marsupials contains some three or four generically distinct types whose relationship with the Australian members of the order is in the direction of the dasyures and bandicoots rather than with the kangaroos and phalangers. Included in one family, they are popularly known as Opossums, but differ among themselves very considerably both in aspect and habits. The most remarkable among them is undoubtedly the so-called Yapock, or Water-opossum, an inhabitant of South America, and ranging in its distribution from Guatemala to Brazil. In both form and habits this animal so closely resembles an otter that it was referred by the earlier naturalists to the Otter Tribe. It tunnels holes in the banks of the rivers it frequents, and feeds entirely upon fish, crustacea, and aquatic insects. The feet, and more especially the hind ones, are distinctly webbed ; the tail is naked, scaly, and non-prehensile; and the fur is short and thick, as in the ordinary otters. The ground-tint of the fur is a light grey: this is diversified by a black or dark brown stripe that runs down the centre of the back, and expands over the shoulders, loins, and hindquarters into saddle-shaped patches or bands of the same dark hue.

The Common or Virginian Opossum, while the only representative of the Marsupial Order found in the temperate latitudes of the North American Continent, has a very considerable range of distribution, occurring in equal abundance throughout the tropical regions of South America. In these warmer latitudes it differs to such an extent in the character of its fur and other minor points that it was for some time regarded as a distinct species, and was distinguished by the title of the Crab-eating Opossum. Biologists are, however, now agreed that the supposed species is only a local variety. As a matter of fact, a very considerable amount of variation in the colour and markings is found to exist among the individuals of the most familiarly known northern race. In form the animal may be suitably compared to a huge rat, nearly equalling a cat in size, with an abnormally large head and pointed snout. The tail is long, almost naked for the greater portion of its length, and pre-eminently prehensile. The fur is of a mixed character, consisting of an undergrowth of a fine, close, woolly texture, through which protrudes a less dense series of long bristle-like hairs. The colour of the fur ranges from black to white, and includes all varieties of intermixture. The face, more especially in the northern race, is usually much the lightest or altogether white, while in the tropical South American examples it is more often darker, or it may be completely black.

The opossum, like the rat, is an omnivorous feeder; and being of so much larger size, and possessing an insatiable appetite, constitutes itself a veritable pest to the fruit-grower, the agriculturist, and the poultry-farmer. In effecting its entrance to hen-roosts or other food-yielding enclosures, it exhibits an amount of cunning and pertinacity possessed by no other mammal. Caught red-handed in these depredations, it has recourse to stratagems which have won for it a reputation that has long since passed into a household word. Feigning death, or "playing 'possum," is a game at which it is well known to be a past-master, but by

Photo by W. Saville-Kent, F.Z.S.

YAPOCK, OR WATER-OPOSSUM

In habits, although not in size and colour, this marsupial may be compared to a wolf

which it still frequently succeeds in hoodwinking the unwary, and so saves its skin. Discovered thieving, and receiving perhaps a haphazard but by no means disabling blow, it at once collapses, and with film-covered eyes and protruding tongue is to all intents and purposes dead. It may be kicked round the premises, and finally probably taken up by the tail and flung ignominiously outside, without betraying vitality by even so much as a wink. But no sooner is the coast thoroughly clear of the avenger than the stiffened limbs relax, the eyes reopen, and Brer 'Possum trots off, as fresh as ever. Maybe it is the ripening maize or the persimmon-patch that next engages his attention, and in either case he walks in and feeds right royally, laying up a goodly store of fat against the approaching winter months of scarcity.

Away from human habitations the opossum is an essentially arboreal animal, living and breeding for the most part, like his Australian cousins, in hollow trees, and making excursions therefrom in all directions in quest of food. His much-mixed natural diet may consist of tender shoots and leaves, and the wild grapes and the many other berries and fruits the forest produces. He craves, however, after a due admixture of animal pabulum, and birds and their eggs, insects, lizards, and the smaller mammals furnish their quota to his menu. Crustacea, such as crabs and the crayfish which abound in the American streams and marshes, have an irresistible attraction for him; and it is on this account that, in the southern area of his distribution, where these crustacea are so plentiful as to constitute his main diet, and his face is browned by the more glowing sun, he is known by the title of the Crab eater.

Although fattening up against the winter, he, even in his most northern limits, does not hibernate, but may even be seen leisurely picking his way over the snow, probably tracking some unfortunate squirrel to its lair, which in due time is located, dragged out, and devoured. While assimilating his meal of flesh or fruit, Brer 'Possum likes to have all four hands at liberty, his hind feet being also graspers; and so he twists his tail round a convenient branch, and, hanging *perdu*, leisurely enjoys his feast. The opossum, like the rat — to which it has in aspect and many of its habits been likened — is a most prolific breeder, as many as from six to sixteen young being comprised in the litter. When born, they are immediately transferred to the somewhat capacious pouch, and remain there without venturing outside until they are about the size of an ordinary mouse.

A third and very distinct type of American opossums is the one represented on page 380, which, from its mouse-like size and aspect, is commonly known as the MURINE OPOSSUM. The most distinct feature of this little animal is that, though a genuine marsupial, it has no pouch, but carries its young on its back, the little creatures twining their tails round that of their mother, and so securing a stable anchorage. Although thus loaded up and transformed for the time being into a sort of combination perambulator and feeding-flask, the happy but anxious parent pursues the even tenor of her way among the tree-branches and thicket-growths with almost unabated agility. This species, in common with MERIAM'S OPOSSUM and the WOOLLY OPOSSUM and several others which carry their young, to as many as a dozen

in number, on their backs, are denizens of tropical South America. One of these, named the PHILANDER OPOSSUM, attains to the somewhat larger size of about 2 feet in total length, the long prehensile tail representing, however, the greater moiety of these dimensions.

THE SELVA

South America has one other marsupial — the SELVA — an animal which, while possessing the dimensions and much of the aspect of an ordinary rat, is remarkable as differing so materially in the character of its teeth and other structural points that it cannot be referred to any existing marsupial family. On the other hand, this type is found to coincide in the above particulars with species hitherto only known in the fossil state, and excavated from the same tertiary deposits in Patagonia which have been productive of the distant ally of the Tasmanian wolf. It is yet hoped by zoologists that the discovery of other interesting and possibly some supposed extinct mammals may reward the thorough exploration of the vast South American forests. The capture in the flesh of some form allied to the huge ground-sloths, such as the Mylodon and Megatherium, is, however, now considered to be quite beyond the pale of possibility.

Photo by Dr. R. W. Shufeldt [*Washington*

YOUNG OPOSSUM (NATURAL SIZE)

This is an interesting photograph, as it is reproduced life-size, and gives an excellent idea of the animal in its native land

Photo by W. Saville-Kent, F.Z.S.

WOOLLY AMERICAN OPOSSUM

This animal is about the size of a large mouse. It carries its young on its back, their tails being entwined round that of their parent

MONOTREMES, OR EGG-LAYING MAMMALS

WITH this group or order of the Mammalian Class we arrive, as it were, on the borderland between the mere typical Mammals and Reptiles. In the last group, that of the Marsupials, it was observed that the young were brought into the world at an abnormally early and helpless phase of their existence, and usually consigned, until able to see and walk, to a variously modified protective pouch. With the Monotremes a yet lower rung in the evolutional ladder is reached, and we find that the young are brought into the outer world as eggs, these being in the one case deposited in a nest or burrow, and in the other carried about by the parent in a rudimentary sort of pouch until they are hatched.

The living representatives of this singular mammalian order are but few in number, being restricted, in point of fact, to only two distinctly differentiated family types — the Echidna or Porcupine Ant-eater, and the Platypus. These monotremes, moreover, like the majority of the existing marsupials, are limited in their distribution to the Australasian region. The single species of the Platypus is only found in Tasmania and the southern and eastern districts of the Australian Continent, while the Echidna numbers some three recognised species, two of which belong to Australia and Tasmania and the third to New Guinea.

THE ECHIDNA

The ECHIDNA, PORCUPINE ANT-EATER, or "PORCUPINE," as it is commonly called by the Australian colonists, would seem at first sight to represent an animal in which the characters of the hedgehog and the common porcupine are interblended, the innumerable spines being longer than those of the former, but less in length than those of the last-named animal. The head, with no externally visible ears and remarkable elongated beak-like snout, however, at once proclaims it to be altogether distinct from these. The animal has no teeth, and the tiny mouth at the termination of the beak-like snout simply constitutes an aperture for the extrusion of the worm-like glutinous tongue, wherewith, after the manner of the true ant-eaters, it licks up the inhabitants of the ants' nests upon which it feeds. For tearing down the ants' nests and obtaining its customary food, as also for its inveterate burrowing propensity, the feet, and more especially the front ones, are provided with strong, blunt, and very powerful claws. The male animal is in addition armed on the hind feet with a peculiar supplementary spur, which is, however, still more conspicuously developed in the platypus.

Three distinct species of the echidna are recognized by zoologists. The one peculiar to the cooler climate of Tasmania is remarkable for its more slender spines, the much greater abundance of the long bristle-like hairs, and the thickness of the seal-brown under-fur, as compared with the typical Australian form. In North-west New Guinea the largest and most aberrant form is met with. Normally it has only three toes in place of five to each foot, the spines are very long and thick, the body is deeper and more compressed, and the animal stands comparatively high upon its feet.

The writer, during his residence in Tasmania, had several examples of the local species as domestic pets. For the first few days they were very shy and untractable, burrowing into the earth and seeking to escape, or presenting an impenetrable *cheval de frise* of sharp-pointed spines to the hands that sought to caress them. After a short interval, however, the creatures became entirely reconciled to human society and the small amount of restraint to which they were subjected. They would follow their owner about the garden, or, flattening their bodies and spreading out their limbs to the greatest extent, lie basking in the sun close to where he might be seated. They also apparently appreciated being carried, slung across their owner's arm after the manner of a lap dog. Living in the near vicinity of unreclaimed bush-land, it was found possible to keep these echidnas well supplied with their customary food; they were, in fact, permitted to forage on their own account. Liberated amidst their normal surroundings, they would walk leisurely from one ant-hill to another, tearing down the side of it with their powerful front claws, and appropriating its living contents with the greatest relish. It was observed, however, in this connection that the echidna paid attention entirely to the succulent white larvæ and pupal phases of the insects with which the inner chambers of the ant-hills are customarily crowded, and that adult ants, as they abounded in the tracts near at hand or elsewhere, were altogether neglected. In addition to this natural food these animals were supplied daily with a saucer of either well-softened bread or porridge and milk, for which they evinced a decided appreciation, assimilating this food dexterously, though somewhat slowly, with the aid of their long protrusile tongues. Allowed to wander about the house, they displayed a most inquisitive turn of mind, peering into every crevice, and climbing upon every accessible article of furniture.

The echidna usually produces only one egg at a time; it is relatively small, not larger than a sparrow's egg, but equally and obtusely rounded at both extremities, and with a white leathery shell like that of a reptile. For some time previous to hatching, this egg is carried in a skin-fold or rudimentary pouch in the parent's abdomen, much similar to that possessed by many of the marsupials. The young one is also retained in this pouch for some weeks after escaping from the egg. When finally leaving the pouch, it is between three and four inches in length, and the spines are in an altogether rudimentary condition.

Examples of the Australian echidna have on several occasions been "in residence" at the Zoo; while the Hon. Walter Rothschild has been fortunate in keeping living specimens of both this and the very rare three-toed New Guinea variety in his admirably appointed menagerie at Tring

The Platypus

The egg-laying mammal known as the Duck-billed Platypus differs very essentially from the echidna both in aspect and habits. It is adapted especially for an amphibious life, and for feeding on molluscs, worms, and insects, which it abstracts from the muddy bed or banks of the rivers that it frequents. The somewhat depressed ovate body is covered with short dense fur much resembling in colour and texture that of an otter. The tail is short and flattened like that of a beaver, but in place of being naked and scaly, as in that animal, is covered, on the upper surface more

Photo by W. Saville-Kent, F.Z.S.

COMMON OR VIRGINIAN OPOSSUM

The only marsupial animal found north of Mexico

particularly, with long, coarse, bristle-like hairs that intercross one another in all directions. Neither is this tail used, as with the beaver, as a mason's trowel, it being simply subservient as a steer-oar. The feet are all four distinctly webbed, the membranes of the front feet in particular projecting to some distance beyond the extremities of the claws, and so communicating to these members a singular resemblance to the feet of a duck. The head of the platypus tapers off from the body without any conspicuous neck, and terminates in a most remarkable duck-like beak, having at its base a supplementary membranous ferrule-like structure which would seem to serve the purpose of limiting the distance into which the beak of the animal is thrust into the mud during the quest for its accustomed food, and at the same time protecting the creature's eyes. The mouth of the adult platypus contains no teeth, simply a few horny plates; but, singularly to relate, rudimentary teeth exist temporarily in the young animals. These provisional teeth, moreover, correspond in a marked manner with those of some ancient types of mammals which occur as fossils in the tertiary deposits of North America. The platypus, with relation to the obliteration of its teeth in the adult state, is regarded as a very exceptionally modified form and not as the immediate prototype of the ordinary mammals.

The platypus is found in Tasmania and in the south and eastern districts of Australia only, being altogether unknown in the west and north. Being especially shy and retiring, and to a large extent nocturnal in its habits, it is not frequently seen even in districts where it may be rather abundant. The animal excavates burrows of so great a length as from thirty to fifty feet in the river-banks that it frequents, and at the extreme end of these burrows it constructs a loose nest of weeds and root-fibres, which it uses as its retreat, and also for the production of its eggs and young. There are invariably two entrances to these burrows, the one being under water, and the other usually opening into a tangle of brushwood at some little distance from the water's edge. As many as from one to four eggs and young may be produced at a time, but two is the more general number. From the first it would appear that the eggs and young are deposited and nursed in the nest, not being retained or carried about in a pouch, as observed of the echidna.

The late Dr. George Bennett, of Sydney, New South Wales, has probably placed on record the most detailed account of the ways and life-habits of these remarkable animals, though it did not fall to him to solve the much-vexed question as to whether or not they were oviparous. This discovery, as applied also to the like phenomenon in the case of the echidna, was the outcome within quite recent years of the researches of Mr. Caldwell. After much indefatigable exploration, in which he was ably assisted by the natives, Dr. Bennett obtained from the extremity of an exceptionally long burrow a mother and pair of half-grown young. The young ones survived several weeks, and proved most droll and interesting pets. In playful habits they much resembled puppies, chasing and rolling one another over, and pretending to bite with their toothless bills. They were also much addicted to climbing every scalable article of furniture, including even a tall book-case, which they would negotiate by "swarming" up behind it as a sweep climbs a chimney, with their backs to the wall and their feet against the back of the book-case. The sleeping and waking hours

Photo by D. Le Souef [Bretbourne

ECHIDNA, OR ANT-EATING PORCUPINE

The female echidna can carry two eggs in her pouch, which in due course are hatched by the heat of her body

Photo by W. Saville-Kent, F.Z.S.

TASMANIAN ECHIDNA, OR PORCUPINE ANT-EATER

This is the largest variety of the five-toed species; it grows to a length of 20 inches, and has the fur so long as almost to conceal the spines

that both these and other examples kept were observed to be very irregular; for while usually most lively and disposed to ramble after it grew dusk, they would at other times come out of their own accord in the daytime, or perhaps one would ramble about while the other slept. When going to sleep, they would roll themselves up in a perfect ball, the head, tail, and limbs being closely folded over the abdomen.

The food question appears to have presented almost insurmountable difficulties so far against the permanent acclimatisation of these interesting animals in any of our European zoological gardens. At the Melbourne Zoo some considerable success was obtained by fencing off a small pond abounding with insects and well-established water-plants for their reception, and in this instance they had also the advantage of being brought speedily and within a few hours of their capture to their new home. For their long voyage to Europe the provision of an adequate quantity of living insects or other aquatic organisms is a by no means easy task. They have, however, been known to thrive on broken-up river-mussels for the space of two or three weeks, and would probably have done so for a longer period. This material might easily be stored for their use on board ship.

An incident concerning the natural predilections of the platypus that fell within the writer's observation in Tasmania might also be utilised in their experimental transportation. At the trout- and salmon-rearing establishment on the river Plenty—of which the writer was at the time superintendent—the platypuses proved to be most destructive to the spawn both deposited in the hatching-boxes and upon the natural spawning-beds, or "redds," and they had in consequence to be systematically destroyed. This being the case, it is probable that they would be found to thrive well on a diet consisting to a large extent of the preserved roes or spawn of any easily procurable fish—such as the Murray perch and cod—and of which adequate supplies might with facility be stored aboard ship. The admixture in all cases of a certain amount of sand or mud with their provided pabulum would appear to be essential for digestive purposes, such material being always found in considerable quantities in their stomachs when dissected.

A distinguishing feature which the male platypus shares in common with the echidna is the peculiar spur developed on its hind foot. It is in this case, however, much larger and sharper, and has been accredited with aggressive functions and poisonous properties. There can be little doubt, however, that they are normally used by the animal only as clasping or retaining instruments during intercourse with the female at the breeding-season. At the same time, undoubted cases of persons receiving severe wounds from these animals' spurs have been placed on record. One such that fell within the writer's cognisance happened on the Murray River, on the Victorian and New South Wales boundary. A young fisher-lad, on taking up his nets, found a half-drowned platypus entangled in them, and, whilst disengaging it, it convulsively

Photo by W. Saville-Kent, F.Z.S.

DUCK-BILLED PLATYPUS

This curious egg-laying mammal, the only representative of its family, is mainly nocturnal in habits

gripped his hand between the two spurs, the points penetrating deeply into the flesh on either side. The result was a festering wound that refused to heal for many months, and for such time entirely deprived the lad of his use of that hand.

The fur of the platypus, dressed so as to remove the outer and longer series of hairs, nearly resembles that of the fur-seal in both colour and texture, and as a rare local product is highly prized for the manufacture of carriage-rugs and other articles.

WITH the egg-laying Echidna and Platypus we terminate the Mammalian Series, and they pave the way to the typical egg-laying animals which follow.

CASSOWARY.

The female Cassowary is larger than her mate, and her colouring is of equal brilliancy.

The Living Animals of The World

BOOK II. BIRDS

BY W. P. PYCRAFT, A.L.S., F.Z.S.

CHAPTER I

THE OSTRICH AND ITS KINDRED

Photo by W. P. Dando, F.Z.S.

RUFOUS TINAMOU, BRAZIL

The tail-feathers of these birds are so small as to appear to be wanting

THE Ostriches are a very ancient group of birds, and, judging from what we know of their anatomy, they must be regarded as representing the most primitive of living birds. With the exception of a single group, to be discussed presently, all have lost the power of flight. In some, in consequence, the wing has become reduced to a mere vestige. It is a rule in Nature, we may remark, that whenever an organ, such as a wing or a leg or a tail, ceases to be useful, it undergoes forthwith a slow process of reduction or degeneration, growing smaller and smaller in each successive generation, till at last it may even disappear altogether. The loss of flight has been accompanied by a degeneration in the quality of the feathers — that is to say, their serviceability as aids to flight has been entirely lost.

Photo by H. Noble, Esq.

RHEA AND YOUNG

Although the wings of the rhea are large, they fit so closely to the body as to be invisible when closed

The size of the members of this group varies much. The largest of all is the African Ostrich; the smallest, of the flightless forms, the New Zealand Apteryx. The ostrich-like birds which have retained the power of flight are known as Tinamous, and are natives of South America. All these are smaller than the flightless Apteryx.

TINAMOUS

The TINAMOUS should perhaps be regarded as standing at the head of the Ostrich Tribe, since they have reached a higher degree of development than any other of its members. They have also preserved the power of flight. In their general appearance they bear a singular resemblance to partridges, though a little careful observation will reveal many points wherein they differ therefrom. They are very confiding and unsuspicious birds — some persons call

Photo by H. Noble, Esq.

RHEA AND YOUNG ONES

Although frequently bred in this country, the young do not seem to be easily reared

them stupid on this account — and in the early morning the species inhabiting the Argentine pampas will, observers tell us, come right up to the isolated houses of the settlers, so that the boys knock them down with stones. The delicate quality of the flesh has caused these birds to be highly esteemed as food, and their trustful nature renders them an easy prey, so much so that in some districts they have been almost exterminated. Large numbers are caught by riding round them in a circle and securing them with a noose. Mr. Hudson, who lived many years in the pampas, assures us that the GREAT TINAMOU is one of the sweetest-voiced of the native birds. The song is composed of "five modulated notes, flute-like in character, and very expressive, and is uttered by many individuals answering each other as they sit far apart, concealed in the grass."

The eggs of the tinamous are to be reckoned among the wonders of bird life, being so highly burnished as to look like beautifully glazed porcelain. The colour varies according to the species, ranging from wine-red, blue-green, and brown to black. The young are almost as remarkable as the eggs, being clothed with a peculiar down, of great complexity of structure, and resembling in some respects the nestling down of the true ostrich.

THE RHEA

The RHEA is a native of South America. It is frequently referred to as the SOUTH AMERICAN OSTRICH, and also as the NANDU. The resemblance which it bears to the true ostrich is striking, but it may at once be distinguished therefrom by the fact that it has three toes and a feathered head and neck; furthermore, it is smaller in size, and lacks the conspicuous white wing- and tail-plumes. The tail, indeed, as may be seen from the photographs reproduced is wanting. The rhea must be regarded as standing at the head of the flightless members of the Ostrich Tribe. Its wings, though not large enough to raise its heavy body from the ground, are yet of considerable size.

In Buenos Ayres rheas are hunted with dogs. If a breeze is blowing, the birds raise one wing, which acts as a sail. This done, they can acquire a speed which makes it absolutely impossible for either dog or horse to come up with them. The only chance of ultimately capturing them is by wearing them out

Photo by Scholastic Photo. Co.]

RHEA LYING DOWN

The breast of the larger members of the Ostrich Tribe is provided with a large horny plate, on which they support the body when resting

by ceaseless pursuit. A chase of this kind may last an hour and a half. Needless to say, for sport of this kind both horses and dogs must be the best of their kind and in "good form." The natives and Indians hunt them on horseback with the "bolas." The bolas, or balls, used for this purpose consist of two round stones covered with leather, and united by a thong of about 8 feet long. One of these is held in the hand and the other whirled round the head and suddenly released, when both go whirling madly round till they strike the rhea's legs, around which they instantly twist, and the victim is a fast prisoner.

The rhea is in danger of disappearing altogether as a wild bird, owing to the ruthless slaughter which is made upon it for the sake of its feathers. For some years back, Mr. Harting tells us, "the number of birds killed has averaged 400,000 per annum, and, as a consequence, the species has already disappeared from nearly half the territory of the River Plate." On some estates in Argentina the wild birds are driven in and plucked.

Like most of the Ostrich Tribe, the male alone performs the duties of incubation, hatching

Photo by F. T. Newman] *[Berkhamsted*

RHEAS IN TRING PARK

In spite of its large size, the rhea is not a conspicuous bird in a wild state, the grey plumage harmonising perfectly with the surrounding pampas

some twenty eggs at a time, the produce of several different females. There are three different kinds of rhea, but they do not differ much one from another. The young are curiously striped. The egg is very large, of a cream colour, and deeply pitted.

Darwin, in his "Voyage of the Beagle," tells us that when he was "at Bahia Blanca, in the months of September and October, the eggs, in extraordinary numbers, were found all over the country. They lie either scattered and single, in which case they are never hatched, and are called by the Spaniards huachos; or they are collected together into a shallow excavation which forms the nest. Out of the four nests which I saw, three contained twenty-two eggs each, and the fourth twenty-seven. In one day's hunting on horseback sixty-four eggs were found: forty-four of these were in two nests, and the remaining twenty scattered huachos. The Gauchos unanimously affirm — and there is no reason to doubt their statement — that the male bird alone hatches the eggs, and for some time afterwards accompanies the young. The cock, when on the nest, lies very close: I have myself almost ridden over one. It is asserted that at such times they are occasionally fierce and even dangerous, and that they have been

known to attack a man on horseback, trying to kick and leap on him. My informer pointed out to me an old man whom he had seen much terrified by one chasing him. . . . I understand that the male emu in the Zoological Gardens takes charge of the nest: this habit, therefore, is common to the family.

"The Gauchos unanimously affirm that several females lay in one nest. I have been positively told that four or five hen birds have been watched to go, in the middle of the day, one after another, to the same nest. . . . Although this habit at first appears very strange, I think the cause may be explained in a simple manner. The number of eggs in the nest varies from twenty to forty, and even fifty; and according to Azara even seventy or eighty. Now, although it is most probable, from the number of the eggs found in one district being so extraordinarily great in proportion to the parent birds, and likewise from the state of the ovarium of the hen, that she may, in the course of the season, lay a large number, yet the time required must be very long. . . . If the hen was obliged to hatch her own eggs before the last was laid, the first probably would be addled; but if each laid a few eggs at successive periods in different nests, and several hens . . . combined together, then the eggs in one collection would be nearly of the same age. If the number of eggs in one of these nests is, as I believe, not greater on an average than the number laid by one female in the season, then there must be as many nests as females, and each cock bird will have its fair share of the labour of incubation: and that during a period when the females probably could not sit, from not having finished laying. I have before mentioned the great number of huachos, or deserted eggs; and that in one day's hunting twenty were found in this state. It appears odd that so many should be wasted. Does it not arise from the difficulty of several females

Photo by the Duchess of Bedford

WHITE RHEAS

These are only varieties of the common form, not a distinct breed

associating together, and finding a male ready to undertake the office of incubation? It is obvious that there must at first be some degree of association between at least two females, otherwise the eggs would remain scattered over the wide plains, at distances far too great to allow of the male collecting them into one nest: some . . . have believed that the scattered eggs were deposited for the young birds to feed on. This can hardly be the case . . . because huachos, although often found addled and putrid, are generally whole."

Photo by W. Reid] *[Wishaw, N. B.*

OSTRICH STANDING BESIDE HER EGGS

In a wild state both cock and hen take part in the preparation of the nest

The Ostrich

The Ostrich is the giant amongst living birds, the full-grown male standing some 8 feet high, and weighing about 300 lbs. It is flightless, the wings being smaller, in proportion to the size of the body, than in the rhea. But the energy which in other birds is employed in sustaining flight in the ostrich is expended in running, so that it has reached a high degree of speed — no less, in fact, than twenty-six miles an hour. When at full speed, it is generally believed the ostrich derives no small help from the wings, which are used sail-wise. Nor is this belief by any means a modern one, for all of us must be familiar with Job's observations on this subject: "What time she lifteth up her wings on high, she scorneth the horse and his rider." The wings are never used in running at full speed, but are of much service in turning, "enabling the bird to double abruptly, even when going at top speed." In justice to the older observers, however, it must be remarked that ostriche *do* run with raised wings, but only at the commencement of the run, or in covering a short distance, when the pace may be considerable; but if circumstances demand "full speed ahead," they are held close to the body, where they offer the least resistance to speed.

With the gradual perfection of its running powers, there has followed a gradual change in the form of the leg. This change has taken place by reduction in the number of the toes. Of the original five with which its ancestors began life only two now remain — the third and fourth. The third is of great size, having apparently waxed great at the expense of the other toes, a growth which seems to be still in progress, inasmuch as the fourth toe is undoubtedly dwindling. It is very small, and gives unmistakable signs of growing smaller, since it has now become nailless. When it has quite disappeared, the ostrich, like the horse, will have but a single toe on each foot — the third. The dainty, mincing step of the ostrich is a delight to watch, and, thanks to the Zoological Gardens, this can be done.

The ostrich, like its cousin of South America, the rhea, commonly associates with herds of the larger mammalia. On the South African veldt the companions of the ostrich are the zebra, wildebeest, and hartebeest, just as on the pampas of South America the rheas are found associated with herds of deer and guanaco.

The egg of the ostrich weighs about 3 lbs., and is of delicious flavour. The empty shell, it has been found by experiment, is large enough to hold the contents of eighteen eggs of the common domesticated fowl. It takes about forty minutes to boil an ostrich egg hard. About fifteen eggs represent the clutch. The nest is a mere depression in the sand. The hen sits by day, and her mate by night; but the eggs are *never* left, as is sometimes stated, to the heat of the sun, so as to lessen the duties of the parent. Such a course would infallibly destroy the eggs, for the sun's rays, especially at noon, are very powerful.

The male and female ostrich differ much in coloration. In the former the trunk is clothed in a vestment of richest black, whilst the quills of the wings and tail-feathers are of pure white: they form the much-prized ostrich plumes. The female is much less splendid, being clothed in sober grey. But these colours are not merely ornamental; they render the male by night and the female by day invisible, owing to the perfect harmony they make with their surroundings, thus affording an interesting illustration of protective coloration.

"All ostriches," says Mr. Cronwright Schreiner, "adults as well as chicks, have a strange habit known as 'waltzing.' When chicks are let out from a kraal in the early morning, they will often start away at a great pace. After running for a few hundred yards they will all stop, and, with wings raised, spin round rapidly for some time, often till quite giddy, when a broken leg occasionally occurs. Adult birds, when running in large camps, will often, if the veldt is good, do the same, especially if startled in the fresh of the early morning. A troop of birds waltzing, in full plumage, is a remarkably pretty sight. Vicious cocks 'roll' when challenging to fight, also when wooing the hen. The cock will suddenly bump down on to his 'knees' . . . open his wings, making a straight line across his breast, and then swing them alternately backwards and forwards . . . as if on a pivot, each wing, as it comes forward, being raised, while that going backward is depressed. The neck is lowered until the head is on a level with the back, and the head and neck swing from side to side with the wings, the back of the head striking with a loud click against the ribs, first on the one side and then on the other. The click is produced by the skin of the neck, which then bulges loosely just under the beak and for some distance downwards. While 'rolling,' every feather over the whole body is on end, and the plumes are open, like a large white fan. At such a time the bird sees very imperfectly, if at all; in fact, he seems so preoccupied that, if pursued, one may often approach unnoticed. I have walked up to a 'rolling' cock and seized him by the neck, much to his surprise. Just before rolling, a cock, especially if courting the hen, will often run slowly and daintily on the points of his toes, with neck slightly inflated, upright and rigid, the tail half drooped, and all his body-feathers fluffed up; the wings raised and expanded, the inside edges touching the sides of the neck for nearly the whole of its length, and the plumes showing separately, like an open fan . . . on each side of his head. In no other attitude is the splendid beauty of his plumage displayed to such advantage."

Photo by W. Reid] *[Wishaw, N.B.*

OSTRICHES TEN DAYS OLD

The down-feathers of young ostriches are quite different from those of other birds, the tips of each being produced into a horny ribbon

The males are very fierce while guarding their eggs or fighting for mates, and kick with extraordinary violence with their powerful legs. As an example of their fierceness when aroused, Mr. Cronwright Schreiner, who knows much of these birds, relates a story, told him by a

Photo by Mr. Glenday] [*Cape Town*

AN OSTRICH FAMILY

The cock bird is an unusually fine specimen, measuring exactly 8 feet from head to foot

railway-guard, of an old male who charged a goods-train coming at full speed down a steep gradient. The bird, as soon as he caught sight of the train, at once got on the line, "and advanced fearlessly to fight the monster. As the screeching engine approached, he rushed at it from straight in front, hissing angrily, and kicked. He was cut to pieces the next moment."

The Bedouin tribes hunt the ostrich on dromedaries, so also do the natives of Somaliland, and when near enough shoot it with poisoned arrows. In the Sahara, Canon Tristram tells us it is ridden down on horseback, a method of capture which the Sahara sportsman regards as the greatest feat of hunting.

"The Bushmen," says Mr. Harting, "like the Somalis, kill the ostrich with poisoned arrows, or catch it very cleverly in pit-falls or with the lasso, and the Sukurieh and Hadendawah tribes likewise use the lasso, with which the bird, when once fairly caught, is strangled. . . . A favourite plan is to wait for the birds in a place of concealment, as near as

Photo by Schroeder] *[Zurich*

A GROUP OF COCK OSTRICHES

Note the conspicuous tail in these birds; it is wanting in other members of the Ostrich Tribe

possible to the pools to which they come for water, and then, with a gun loaded with swan-shot, to fire at their necks as they stoop to drink, when perhaps half a dozen are laid low at once. . . . Another plan to which the Bushman often resorts is simpler still. Having found an ostrich's nest, he removes all the eggs, and, ensconcing himself in the nest, quietly awaits the return of the bird, which he shoots with a poisoned arrow before it has time to recover from its surprise at finding him there instead of the eggs. . . . In Senaar the Abû-Rôf bring it down by throwing a curved flat stick from $2\frac{1}{2}$ to 3 feet long, not unlike the Australian boomerang, and made of tough acacia-wood or hard zizyphus."

Mr. Arthur Glynn, of Leydenburg, gives a graphic description of an ostrich hunt, his quarry being a troop of twenty birds — "on sighting which," he tells us, "we immediately gave chase, discovering directly afterwards that a single bull wildebeeste was among them. After a stiff gallop," he says, "of half a mile, we got within seventy yards of the troop; so reining in, we both dismounted and fired, bringing down one ostrich and the wildebeeste bull. . . . We quickly mounted and continued the pursuit, the ostriches never running for any distance in a direct

course, but always turning and twisting, which made it difficult for us to keep them in sight. . . . We went sailing on, neck and neck, regardless of holes or anything else, only thinking of the grandly plumaged birds in front of us, our horses straining every nerve to overtake them, as only old stagers know how to run when in pursuit of game. We had now approached within fifty yards, and, jumping down, we fired at two cock birds running separately from the troop, bringing them both down. Hastily mounting, we continued on after the retreating troop; but at this juncture my friend's horse trod in a hole, sending his rider over his head, thereby completely putting him out of the run. I now continued the chase by myself. For a mile the ostriches gained on me, as they continued to run in a straight line, thereby not enabling me to cut off any point, but obliging me to keep in their rear all the time. . . . I got off twice, and fired several fruitless shots, and then continued the chase for certainly two miles without dismounting once. . . . I now got within a hundred yards, and jumped down. . . . The first shot I fired brought down a fine cock bird, but the second struck the ground over the others, turning them to the right along a low ridge. They appeared very much exhausted, and ran with their wings spread out. . . . I saw that they were coming direct for me, and waited until they were close. . . . When the ostriches approached within fifteen yards, I selected the best-looking bird, and put a bullet through him. He ran on for about twenty yards and fell dead."

Photo by W. P. Dando, F.Z.S.

SCLATER'S CASSOWARY

This bird is not yet full grown, the horny casque on the top of the head being much larger in the adult

Cassowaries and Emeus

With the Cassowaries and Emeus we have come as near as we can get at the present day to the representatives of the ancient type from which the Ostrich Tribe have sprung. But both these forms are to be regarded as having passed the prime of their development, for, like their allies which we have already considered, they have lost the power of flight. Both emeu and cassowary possess, when adult, one character shared by no other living adult bird; they have what may be called double feathers, each feather possessing two shafts of equa length. They appear to follow a custom of their own in the matter of the coloration of their eggs, since these are never white, like those of the rhea or ostrich, but green, with a very rough surface. The young, like those of the rhea, are striped with alternate black and white stripes. The emeu is found only on the continent of Australia; the cassowary occurs both in Australia and on the neighbouring islands of New Guinea, Ceram, and Aru.

The lot of the Cassowary appears to have been cast in pleasant places, making it possible

Photo by D. Le Souef [*Melbourne*

NEST AND EGGS OF EMEU

The feet of the old bird, which was standing near, can be seen behind the eggs

to indulge in the luxury of personal decoration — a decoration, moreover, shared equally by the males and females, both sexes having the head and neck most brilliantly coloured. In some species all the hues of the rainbow are vividly reflected. To show these colours, the feathery covering, still worn by their relatives on the distant continents of Africa and America, has been cast off and the skin left bare. To these gorgeous hues they have added yet other features, for the head is surmounted in many species by a huge casque, or helmet; whilst from the neck depend curious fleshy lobes, or wattles, coloured in accordance with the rest of the bare, coloured skin of this region. Then, too, they have effected quite a novel transformation in the quills of the wing, for these project on either side of the body in a series of shining black spines. Nor is this all, for over and above the energy which they have to spare for personal decoration is a very large reserve to be expended in fighting. The males are very pugnacious, and to give point to this pugnacity they wear a very formidable weapon on the inner toe in the shape of a huge nail, which can inflict a really dangerous wound. It is used in kicking, the foot being brought forwards and downwards with incredible speed and great force. When wounded, these powerful birds are very dangerous to approach. "On more than one occasion a wounded bird has caused a naturalist to take to a tree. The sharp nail of the inner toe is a most dangerous weapon, quite equal to the claw of a large kangaroo, and capable of doing quite as much execution."

Although forest-haunting birds — wherein they differ from their allies, which are plain-dwellers — the cassowaries are adepts at swimming. There is a danger that these beautiful and interesting birds will slowly be exterminated by greedy and thoughtless settlers. The Australian cassowary is already decreasing sadly, being persecuted for the sake of its skin, which is used for rugs and doormats.

The EMEU, though a sort of cousin of the cassowary, boasts none of its splendour; on the contrary, it is a dull, dowdy-looking bird. In size, however, it is much larger than the cassowary. The wings, which are exceedingly small, have numerous tiny quill-feathers — not long, hard spines, as in the cassowary. When in captivity, it exhibits great curiosity; furthermore, it is swift to realise symptoms of fear in the faces of any visitor whom it may have under inspection. Occasionally fear turns into flight, and then, thoroughly entering into the joke, the emeu pursues at top speed. Needless to say, hunting of this kind can only be done in fairly large paddocks or parks; but emeus are frequently so kept.

A very remarkable and quite unique structure in the emeu is a curious bag or pouch, formed by a sort of out-pocketing of the inner lining of the windpipe. Emerging through a long slit caused by the incompleteness of some of the rings near the middle of the windpipe, the

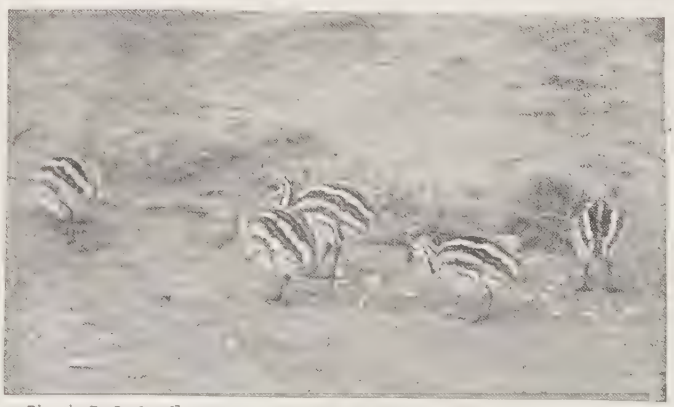


Photo by D. Le Souef [*Melbourne*

YOUNG EMEUS FIVE DAYS OLD

Young emeus just out of the shell have the legs beautifully spotted, but these spots are rapidly lost

pouch comes to lie between this tube and the skin. Strangely enough, it is found only in the female, and is used by her chiefly during the breeding-season, when she utters a peculiarly loud booming note, which, it is supposed, is caused by the manipulation of the air in the pouch. When moved by any gentle excitement or pleasure, especially on damp evenings or in the dead of night, she also becomes musical, giving forth a note which has been likened to a gong or muffled drum. The male, which is smaller, fleeter of foot, and more docile and inquisitive, is mute, or at most gives forth a suppressed hiss when angry, or a kind of grunt when distressed.

Photo by Scholastic Photo. Co. [*Parson's Green*

YOUNG EMEUS

After a few weeks the black and white stripes become much less conspicuous

At one time the emeu roamed over the whole of the mainland of Australia; but now, alas! it is almost exterminated, being found only far inland and in steadily diminishing numbers. Swift of foot and of great powers of endurance, the emeu has afforded in the past much "sport" to the hunting-man, who followed the dogs, doubtless making comparisons the while between his two-legged prey and his four-footed friend Reynard. The hunt does not end till the bird is thoroughly exhausted, when it must be seized at once by the neck, in order to prevent it kicking, for the legs are so powerful that a blow from the foot is dangerous.

Photo by J. T. Newman [*Berkhamsted*

EMEU

The feathers of the neck of the emeu are much longer than in the rhea; hence the neck seems shorter

Incubation is apparently performed by the male, which sits from fifty-four to sixty-four days. Practically no nest is made, only a shallow hollow being scraped in the sand. The eggs, from seven to thirteen in number, are of a dark bottle-green colour, sometimes lighter, and have the surfaces curiously roughened. The male is smaller than the female, a fact which has led to some confusion, the larger female having at one time been regarded as the male. It will be noted that the emeus not only lack the brilliant colour of the cassowaries, but also the helmet, or casque.

The late Mr. Gould's remarks on the edibility of the emeu are interesting. He says: "Its flesh has been compared to coarse beef, which it resembles, according to Mr. Cunningham, both in appearance and taste, and is good and sweet eating; nothing, indeed,

Photo by Robert D. Carson, Esq. [*Philadelphia*

MANTELL'S KIWI, NEW ZEALAND, NORTH ISLAND

When feeding, the kiwi makes a sniffing sound, distinctly audible at some distance

can be more delicate than the flesh of the young ones. There is little fit for culinary use upon any part of the emu, except the hind-quarters, which are of such dimensions that the shouldering of the two hind legs homeward for a mile distance once proved to me as tiresome a task as I ever recollect to have encountered in the colony. I may remark that its flesh proved of the greatest service to Dr. Leichardt and his intrepid companions during their overland route from Moreton Bay to Port Essington, in the course of which, but more particularly between the head of the Gulf of Carpentaria and Port Essington, the sight and capture of the emu was almost a daily occurrence; so abundant, in fact, was it, that he states that he saw in the short space of eight miles at least a hundred, in flocks of three, five, ten, and even more at a time. On the continent of Australia the emu was formerly abundant about Botany Bay and Port Jackson Harbour, but is now only to be seen in the plains of the interior, over whose solitudes it roams in great numbers, and where it breeds, depending on the strength and swiftness of its legs to avoid the pursuit of the stockmen and their dogs. Farther and farther back, however, will it be driven, until it be extirpated, unless some law be instituted to check its wanton destruction."

In a wild state emeus take readily to the water, and have on more than one occasion been seen swimming across a wide river. The South American rhea is also known to be a good swimmer.

The COMMON EMEU is restricted to Eastern Australia. The opposite side of this great continent is inhabited by another and very distinct species, known as the SPOTTED EMEU.

THE APTERYX

To see the APTERYX at home, we should have to travel to far New Zealand, and to hunt with infinite patience when we got there. Apteryx-hunting, it has been found, to be successful, must be done by the help of dogs. Sir Walter Buller has written some very spirited accounts of such hunts. Europeans, indeed, have been singularly successful in this hunting, whereby they have done much to enhance the value of this bird by hastening its fast approaching and inevitable extermination.

The natives call this bird the KIWI, from its call-note, "ki-i-wi." These cries are uttered during the early hours of the night, ceasing after midnight. They appear to have great penetrating power.

Photo by Robert D. Carson, Esq. [*Philadelphia*

OWEN'S KIWI, NEW ZEALAND, SOUTH ISLAND

This is the smallest of the kiwis

CHAPTER II

THE GAME-BIRDS AND RAILS

IT is not easy in a few words exactly to define a "game-bird." Anatomical details aside, the most characteristic features are the small head and moderately long neck, and a compact body, in which the wings, when folded, are almost entirely concealed. The hind toe is always present, and the claws are adapted for scratching purposes — that is to say, for scratching up the surface of the ground in the search for seeds as food. The wings are hollowed so as to fit close to the body, and the flight, which is noisy and never long-sustained, is nevertheless often exceedingly rapid. The young are hatched covered with down, and able to run in a few hours after birth.

Photo by C. Reid] [*Wishaw, N.B.*

RED GROUSE

This is one of the species in which the toes are feathered

GROUSE AND PTARMIGAN

The birds of this group are distinguished by the feathery covering which clothes the feet. In some grouse, however, the toes are bare. This causes them to resemble the Pheasant group, from which they may be distinguished by the fact that the toes are fringed with horny processes forming a sort of comb.

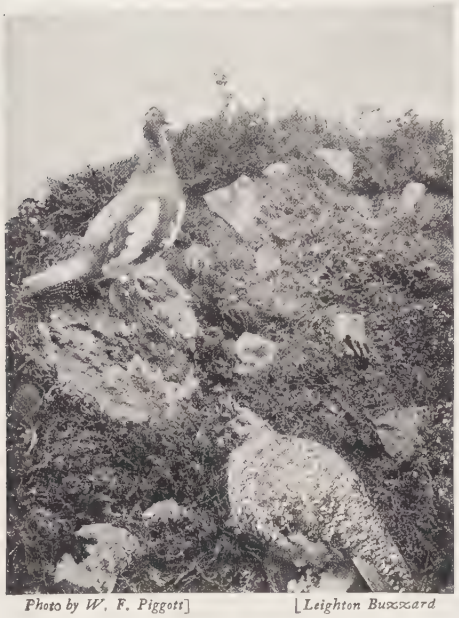


Photo by W. F. Piggott] *[Leighton Buzzard*

PTARMIGAN

In winter these birds don a snow-white livery

The RED GROUSE is the only game-bird which is not found outside the British Islands. It is the bird which perhaps heads the list in the estimation of British sportsmen, who travel north in hundreds every year for the pleasure of the sport it affords. It is furthermore remarkable for the wonderful variety of the seasonal plumages. Both sexes change their dress twice during the year — the female in spring and summer, and the male in autumn and winter. Its Continental relative, the RYPER, has no less than three changes — spring, summer, and winter. For the last season a white dress is adopted, to correspond with its snowy surroundings. The winters in the British Islands are neither long enough nor severe enough to render such change necessary with the red grouse, which is sufficiently protected by its ordinary dress.

Photo by W. F. Piggott] *[Leighton Buzzard*

CAPERCALLIE

This was once a common British bird. The present breed was introduced some years ago, the native birds having been exterminated

The largest and perhaps the most interesting of all the European game-birds are the CAPERCALLIES, or CAPERCAILZIES. The British species is also known as the COCK-OF-THE-WOOD. He is a handsome black bird, nearly as big as a turkey, weighing from 9 to 17 lbs.

Photo by W. F. Piggott] *[Leighton Buzzard*

COMMON PARTRIDGE

This is the commoner and more esteemed of the two species of British partridges

In the spring the capercallie, like the blackcock, indulges in a remarkable "love-song," or "play," as it is called. With outstretched neck, tail expanded like a fan, drooping wings, and ruffled feathers, he commences his call, "peller, peller, peller," increasing in rapidity every moment, till he works himself up into a perfect frenzy. At this time he is perfectly unconscious of all around him, and poachers, knowing this, sometimes take advantage to creep up and shoot him. On hearing the cock, the hens assemble from all parts of the forest. The male then descends from the tree to the ground, when "he and his

PRAIRIE HEN.
(Tympanuchus americanus).
½ Life size.

...GHT 1900, BY A. W. MUMFORD, CHICAGO

female friends join company" and march away. The capercallie is jealous of trespassers on his domain, and instances are on record where people have been attacked when so infringing.

Like the capercallie, the BLACKCOCK must be sought in the woods, whence he sallies forth to the moors and stubble-fields to feed. The GREY-HEN, as the female of this species is called, lays from six to ten eggs, of a buff colour, spotted with rich brown: both in number and colour they resemble those of the capercallie.

The naturalist Brehm gives a delightful account of the love-making of this bird. During the spring, he says, "the bird utters almost continuously the strangest noises. He holds his tail up and spreads it out like a fan, he lifts up his head and neck with all the feathers erect, and stretches his wings from the body. Then he takes a few jumps in different directions, sometimes in a circle, and presses the under part of his beak so hard against the ground that the chin-feathers are rubbed off. During these movements he beats his wings and turns round and round. The more ardent he grows, the more lively he becomes, until at last the bird appears like a frantic creature. At such times the blackcocks are so absorbed that they become almost blind and deaf, but less so than the capercallie."

North America is very rich in large forms of grouse; and one of the most interesting of these is the PRAIRIE-HEN, remarkable for the possession of a pair of curious bags of a bright orange colour on each side of the neck, which can be inflated with air at will.

"Early in the morning," writes Captain Bendire of the praire-hen, "you may see them assemble in parties, from a dozen to fifty together, on some dry knolls . . . and their goings-on would make you laugh. The air-sacs are their ornaments, which they display . . . before the gentler sex by blowing them up till they look like two ripe oranges . . . projecting their long, black ears right forward, ruffling up all the feathers of the body till they stand out straight, and dropping their wings on the ground like a turkey-cock. . . . Then it is that the proud cock, in order to complete his triumph, will rush forward at his best speed . . . through the midst of the love-sick damsels, pouring out as he goes a booming noise . . .

Photo by Dr. R. W. Shufeldt [*Washington*

TEXAN BOB-WHITE (ABOUT HALF NATURAL SIZE)

This bird takes its name from its note — "Bob-White"

Photo by C. Reid] [*Wishaw, N.B.*

GOLDEN PHEASANT

This bird is often kept in aviaries, on account of its magnificent livery

Photo by W. P. Dando, F.Z.S.

GOLDEN PHEASANT

This bird is moulting. In full dress the cape seen in the upper figure is golden with blue-black bars

which may be heard for at least two miles in the still morning air. Every few minutes this display is repeated . . . but they seem careful not to run against each other, for they have not yet got to the fighting-point. After a little while the lady birds begin to show an interest in the proceedings, by moving about quickly a few yards at a time, and then standing still a short time. When these actions are continued by a large number of birds at a time, it presents a funny sight, and you can easily think they are moving to the measure of music."

The prairie-hens of America possess great economic value, as great, indeed, as the red grouse of the British Islands, enormous numbers of prairie-hens being exported to Europe every year, whilst still greater numbers are consumed by the American people themselves. It is said that American grouse will sometimes eat the shoots of a plant called *kalmia*, which renders the flesh poisonous.

The SAGE-GROUSE is a rather large bird, attaining a weight of 8 lbs., found in the Western United States; it is, indeed, the largest of the American grouse. Its courting habits resemble those of the prairie-hens. From the book containing the above lively description we cull the following: —

"Early one morning in the first week in March, 1877, I had the long-wished-for opportunity to observe the actions of a single cock while paying court to several females near him. . . . His large, pale yellow air-sacs were fully inflated,

Photo by W. P. Dando, F.Z.S.

SILVER PHEASANT

A silver pheasant is embroidered as a badge on mandarins' dresses

Photo by C. Reid [*Wishaw, N.B.*

ENGLISH PHEASANTS

These birds are of the ring-necked variety

Photo by Scholastic Photo. Co. [*Parson's Green*

REEVES'S PHEASANT

This is a native of North and West China, and has been introduced into Britain

Photo by Scholastic Photo. Co. [*Parson's Green*

GOLDEN PHEASANT

The female is soberly clad, and has no crest or cape

Photo by W. P. Dando, F.Z.S.

AMHERST'S PHEASANT

This bird is moulting: in full dress the cape is white and the crest blood-red

Photo by W. P. Dando, F.Z.S.

PEACOCK-PHEASANT

These pheasants take their name from the eye-like spots on the wings

Photo by Scholastic Photo. Co. [*Parson's Green*

TEMMINCK'S TRAGOPAN

Tragopans are remarkable for a fleshy horn above each eye, not noticeable save when the bird is excited

Photo by W. P. Dando, F.Z.S.

CHINESE TRAGOPAN

The scarlet plumage of some of the Tragopans is most gorgeous

and not only extended forward but apparently upward as well, rising at least an inch above his head, which consequently was scarcely noticeable, giving the bird an exceedingly peculiar appearance. He looked decidedly top-heavy and ready to topple over on the slightest provocation." He then proceeds to describe the further preparations designed for conquest. The tail is spread fan wise, and animated with a peculiar quivering motion, whilst the wings are trailed upon the ground. When the correct position has been assumed, he advances with stately, hesitating steps towards his mate, uttering, as he moves, "low, grunting, guttural sounds" resembling those of a purring cat, but louder. This, apparently, is the prescribed method of courting; of many suitors, he is selected who performs best.

The RUFFED GROUSE, like the prairie-hen, has the neck, in the male, ornamented with a frill of long feathers. Like many other birds, the female, when danger, in the shape of prowling beasts, threatens her eggs or young, simulates lameness. So soon as the enemy approaches near enough to be dangerous, up she gets with a great noise of wings, and then flutters along the ground as though wounded. The would-be captor is thus led far from the jealously guarded treasures, and when a safe distance has been covered an end is speedily put to this will-o'-the-wisp chase by the bird suddenly taking wing.

PARTRIDGES, QUAILS, AND PHEASANTS

The birds which come under this head are so many in number they may be reckoned by the hundred, and include several forms of exquisite beauty. The legs of many are armed with formidable spurs, with which the males, who are exceedingly pugnacious, fight furiously with their rivals for the possession of some coveted female.

Of the more conspicuous forms we may mention the RED-LEGGED and COMMON PARTRIDGES. In England the former is known more generally as the FRENCH PARTRIDGE — why, it is hard to say. It is a native of South-eastern Europe, whence it was introduced towards the end of the eighteenth century. It is a handsome bird, but not in high favour with sportsmen, since it prefers to escape by running rather than by flight.

The COMMON PARTRIDGE is the more abundant of the two species. Though more sober in coloration, it is still a beautiful bird. The "horse-shoe" mark, borne on the breast, so characteristic of this bird, is *not* confined to the males, as is generally believed. "Yielding," says Professor Newton, "perhaps in economic importance to the red grouse, what may be called the social influence of the partridge is greater than that excited by any other wild bird."

This bird displays great courage and affection in defence of its eggs or young. A story illustrating this is told of a gentleman, who, "whilst superintending his ploughmen, saw a partridge glide off her nest, so near the foot of one of his plough-horses that he thought the eggs must be crushed; this, however, was not the case. . . . He saw the old bird return to her nest the instant he left the spot. It was evident that the next round of the plough must bury the eggs and nest in the furrow. His surprise was great when, returning with the plough, he came to the spot and saw the nest indeed, but the eggs and bird were gone. An idea struck him that she had removed her eggs; and he found her, before he left the field, sitting under the hedge upon twenty-one eggs. . . . The round of ploughing had occupied about twenty minutes, in which time she, probably aided by the cock bird, had removed the twenty-one eggs to a distance of about forty yards."

Photo by W. P. Dando, F.Z.S.

HIMALAYAN MONAL

In some parts of India this bird has been exterminated, owing to the demands of the plume-market

Photo by W. P. Dando, F.Z.S.

HIMALAYAN MONAL

The female of the monal is quite soberly clad

The RED-LEGGED PARTRIDGES, their allies the FRANCOLINS, and the GREY PARTRIDGES are all ground-birds; the TREE-PARTRIDGES, as the name implies, are not, or at least less completely so — hence their mention here. They are natives of the Indo-Chinese countries, and the islands of Java, Borneo, and Formosa.

The QUAIL is a little-known British bird, very like a small partridge in appearance. Enormous numbers, Professor Newton tells us, "are netted on the Continent, especially in the spring migration. The captives are exposed in the poulterers' shops, confined in long, cloth-covered cages, with a feeding-trough in front." The bulk "of these are males, which are the first to arrive, and advantage is taken of this circumstance by the bird-catchers, who decoy hundreds into their nets by imitating the call-note of the female. It has been stated that in the small island of Capri, in the Bay of Naples, 160,000 have been netted in a single season, and even larger numbers are on record." An idea of the vast numbers which travel together in

Photo by C. Reid] [*Wishaw, N.B.*

RED COCHINS

The wings in the typical Cochins are so short as to be useless

migration may be gathered from Canon Tristram's statement that in Algeria, in April, he found the ground covered with quails for an extent of many acres at daybreak, where on the preceding afternoon not one was to be seen. These are the birds which were so eagerly seized by the Israelites as a welcome change in the diet which had become so monotonous in the days of their early wanderings. The story, so vividly told in the Book of Exodus, is, of course, familiar to all.

The quail lays from nine to fifteen eggs in a feeble apology for a nest. It is said that the curious metallic note "clic-lic-lic" gave origin to the Spanish castanet, for these birds are much esteemed in Spain, being kept in cages for the pleasure their notes afford.

There are five or six other species of quail closely related to the above. The British bird enjoys an enormous range, being found almost everywhere in Europe, Asia, and Africa. The so-called AMERICAN QUAILS — some forty species in number — are generally regarded as belonging to a distinct group.

That ornament to all rural scenery, the PHEASANT, is said to have been introduced from the banks of the river Phasis, in Colchis, Transcaucasia, by the Romans — at least, the original form of pheasant was. Late during the eighteenth century a Japanese and a Chinese form were introduced, and these have freely interbred with the original form, so that pure bred specimens of any of the three are rare.

The speed of a pheasant on the wing in full flight has been estimated at thirty-eight miles an hour. Occasionally pheasants will take to the water, and are said to swim well.

The number of pheasants reared by hand at the present day is prodigious. In 1883, Professor Newton tells us, 134,000 pheasants' eggs were sold from one estate in Norfolk, while 9,700 fully grown birds were killed upon it. In olden times pheasants were taken in snares or nets, by hawking, and by the cross-bow; but on the introduction of guns these methods were superseded.

Yet another form of pheasant has been introduced here of late years. This is REEVES'S PHEASANT, a truly magnificent bird, with a tail fully 5 feet long in adult males. These birds also interbreed with the more common forms, but not freely.

Beautiful as these pheasants undoubtedly are, they are eclipsed by many of their relatives. Among the most noteworthy of these we may notice the magnificent TRAGOPANS. Rich in coloration of the feathers, these birds have added an additional feature in brilliantly coloured areas of bare skin on the head and neck, which are furthermore rendered conspicuous by being

Photo by C. Reid] [*Wishaw, N.B.*

BROWN LEGHORN COCK

This breed has been derived by crossing White Leghorns with Game-fowl

Photo by C. Reid] [*Wishaw, N.B.*

SILVER-SPANGLED HAMBURGS

This bird apparently originated in England

Photo by C. Reid] [*Wishaw, N.B.*

DARK BRAMAS

The Brama is an Asiatic breed

developed with "horns" and wattles. These "horns" can be erected at will, a process which causes them at the same time to be greatly increased in size. The bird, with a proud consciousness of his beauty, displays his charms to the full when wooing. Mr. Bartlett tells us that, "after walking about rather excitedly, he places himself in front of the female, with the body slightly crouching upon the legs, and the tail bent downwards; the head is then violently jerked downwards, and the horns and wattle become conspicuous. The wings have a flapping motion, and the bright red patch on them is fully displayed. The whole of the neck appears to be larger than usual during this action, so do the horns, which, moreover, vibrate with every motion. This scene is concluded by the bird suddenly drawing himself up to his full height, with his wings expanded and quivering, the horns erect, and the wattles fully displayed."

Equally splendid, some think more so, are the four species of pheasant known as MONALS or IMPEYAN PHEASANTS. The plumage in this case looks like burnished metal rather than

Photo by C. Reid] [*Wishaw, N.B.*

SILVER WYANDOTTE HEN WITH PHEASANT CHICKS

This is an American breed, derived by crossing with the Brama

feathers. The head is adorned with a crest either of long or beautifully curled feathers. Monals are found in the same haunts as the tragopans — the highest forest regions of the Himalaya.

But the most gorgeous of all the Pheasant Tribe are perhaps the GOLDEN PHEASANTS. The crimson body and exquisitely beautiful collar of gold barred with black constitute a perfectly royal livery. Since, however, these are amongst the commonest occupants of the aviary, we need not describe them further here. They are natives of China and Tibet.

JUNGLE-FOWL AND THEIR DOMESTICATED DESCENDANTS

These birds, of which there are four distinct species, are close allies of the domesticated fowls: the descent of these latter, indeed, is traced from the red jungle-fowl of the Himalaya and Central India. The characteristic features of the group are the naked head, bearing the familiar wattles and fleshy comb, and the formidable spurs on the legs.

The varieties of the domesticated jungle-fowl are numerous. The pugnacity of the

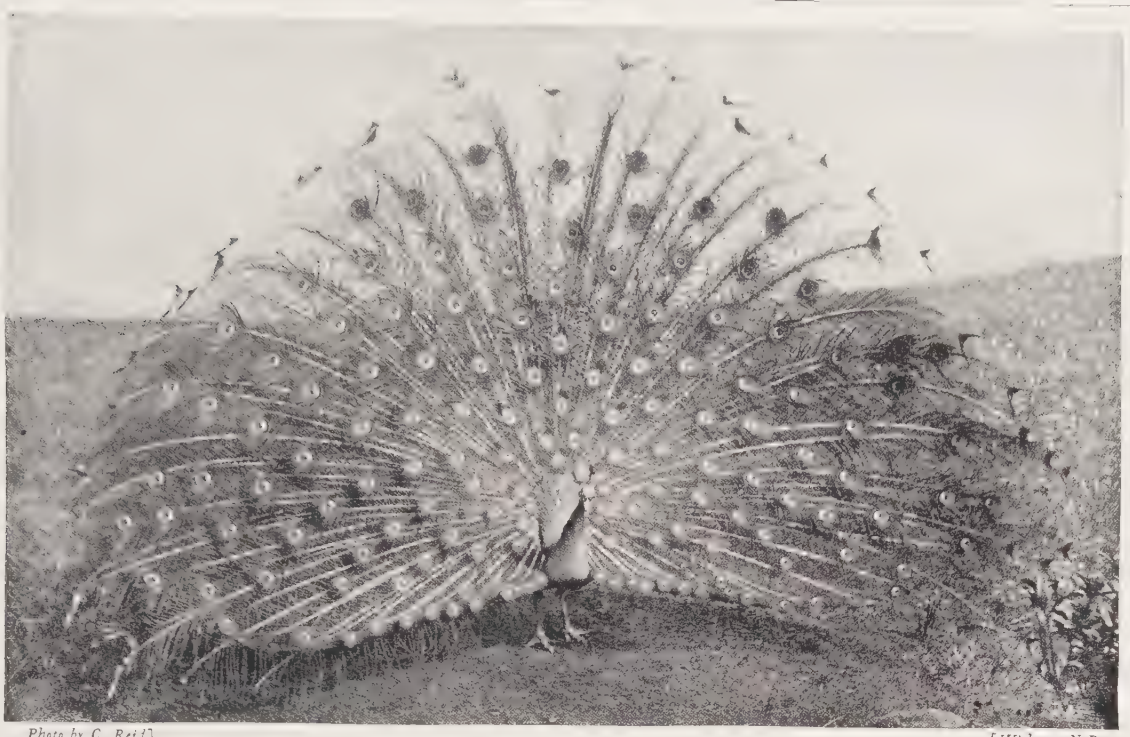


Photo by C. Reid] [*Wishaw, N.B.*

PEACOCK

Note the perfectly symmetrical distribution of the "eyes" in the "train"

members known as the GAME-BREED is well known, and in the days of cock-fighting large sums of money changed hands over the fierce battles waged by rival game-cocks pitted one against the other — the game-cock, it should be remarked, being the little-modified descendant of the red jungle-cock.

The modern game-cock is purely a show-bird, breeders having changed the type by selecting characters which would render the bird quite unable to hold its own if matched in battle with one of the original breed.

Very different from the wild ancestor is the huge, much-feathered COCHIN. This was introduced into England, not from Cochin-China, as is popularly supposed, but from Shanghai, some fifty years ago. At that time this bird enjoyed the reputation of being wonderfully prolific. This is, alas! no longer a feature of the breed. The show-pen is apparently responsible for this, attention having been paid rather to external appearance than to useful qualities.

The PLYMOUTH ROCK and DORKING are both well-known breeds. The former is of American origin, made by crossing Cochins with a native breed — the Dominique.

The BLACK SPANISH, MINORCAS, LEGHORNS, ANDALUSIANS, etc., constitute what are known as the Mediterranean breeds. They are noted for their great prolificacy. This has been gained by carefully breeding from the most productive birds, but with the result that the instinct to sit has been lost entirely. This is a matter of no consequence, however, as when chicks are required there are plenty of "broody" hens of other breeds which can be made to undertake the duties of foster-mother.

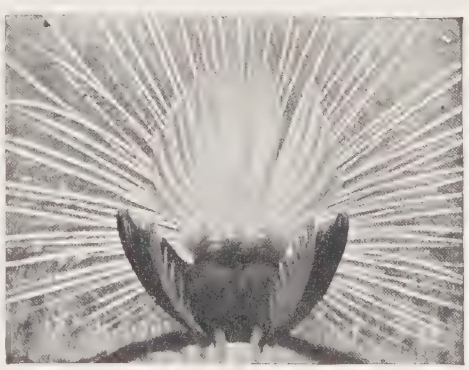


Photo by L. Medland, F.Z.S.] [*North Finchley*

BACK VIEW OF PEACOCK

Note the true tail, like a stout fan, supporting the train

Photo by W. P. Dando, F.Z.S.

BLACK-CHESTED CRESTED GUINEA-FOWL

This is a black bird, with light blue spots

The HAMBURGS are of two kinds — the SPANGLED, which is of English, and the PENCILLED, of Continental origin.

A very old breed is the POLISH. It figures often in the pictures of the old Dutch masters. One of its chief characteristics is the huge crest of feathers rising from the crown of the head. The development of this crest has had a very extraordinary effect upon the conformation of the bones of the skull, entirely altering the shape of the brain-case.

Perhaps the most artificial of all breeds of fowl are the SEBRIGHT BANTAMS. These are diminutive birds, the result of a cross between the Polish with "laced" feathers and a bantam. The feathers of this cross are beautifully "laced" — that is, they are white, edged with black. Another interesting diminutive breed is the JAPANESE BANTAM. The cock carries its tail, which is long, remarkably high, giving a very quaint effect. This breed is further interesting, since it furnishes us with an instance of the breeder's power of localising colour by selection. The tail is black and the body white. Yet another interesting Japanese fowl is the remarkable long-tailed breed in which the tail-coverts grow continuously, attaining a length of from 9 feet to, it is said, 18 feet. The birds are kept for show purposes. The greater part of their lives is passed tethered on high perches. Once a day they are taken down for exercise, when the long feathers are carefully rolled up and securely fastened out of harm's way.

THE ARGUS-PHEASANT AND PEACOCK AND THEIR ALLIES

The ARGUS-PHEASANT most certainly demands notice, on account of the extraordinary development of the wing-quills, which are nearly a yard long, and the wondrous beauty of the pattern thereon. This pattern takes the form of a number of eyes, so shaded as to give the appearance, when fully displayed, of a number of balls lying in a socket. These enormous quills are borne only by the male, and used, like the ornamental feathers of its allies, in captivating the female. When fully displayed, the two wings are spread out to form one huge fan, producing an effect which words cannot adequately describe. The argus-pheasants are found in the forests of Siam, the Malay Peninsula, and Sumatra, and are excessively wary birds.

The PEACOCK is too well known to need a very long description. But a word as to the so-called "tail." This magnificent wealth

Photo by Scholastic Photo. Co. [*Parson's Green*

BLACK-CHESTED CRESTED GUINEA-FOWL

At Durban these birds are often hawked by Kaffir hunters, the flesh being very delicate and much esteemed

PEACOCK.
⅛ Life-size.

COPYRIGHT 1900, BY A. W. MUMFORD, CHICAGO

of plumes does not represent the tail, as is popularly supposed, but is made up of the feathers of the lower part of the back and the upper tail-coverts. These gradually increase in length from before-backwards, culminating in the long and exquisite feathers which form the circumference of the huge, outspread shield. This shield is properly called the "train"; the true tail lies behind it and acts as a support. When the bird is about to display, the "train" feathers are slowly and gently raised till the well-known fan-shaped glory of green and gold and blue is exposed to the fullest possible extent.

"Watch the bird trying to do his best to persuade his chosen what a handsome fellow he is. He first places himself more or less in front of her, but at some little distance off; and then, watching his opportunity, walks rapidly backwards, going faster and faster and faster, till, arrived within a foot, he suddenly, like a flash, turns round and displays to the full his truly gorgeous vestments. This turning movement is accompanied by a violent shaking of the train, the quills of which rattle like the pattering of rain upon leaves. Often this movement is followed by a loud scream.

Photo by the Duchess of Bedford

NEST OF BRUSH-TURKEY

This is made by several birds, of decaying vegetable matter, in which the eggs are laid and left to hatch

"When the train is fully erect, it will be noticed that it lies so far forward that the bird's head and neck appear as if rising from its base. In a side view the whole body, from the front of the wings backwards, appears to lie behind the train."

This bird is a native of India, where it is held in great reverence by the Hindus, and

Photo by C. Reid] [*Wishaw, N.B.*

TURKEY COCK AND HEN

The curious "tassel" depending from the breast is found in no other bird

Photo by Kerry & Co.] [*Sydney*

WALLACE'S PAINTED MEGAPODE

This bird buries its eggs in the sand, burrowing for each a slanting hole from 3 to 4 feet deep

in the Hindu States it is not allowed to be killed under any circumstances. There are two, some say three, distinct species of peacock, but they all closely resemble one another.

Brief mention will serve for the GUINEA-FOWLS and TURKEYS, since they are well known to us all. GUINEA-FOWLS are African birds. The farm-yard form, popularly known as "Come-backs," from their peculiar cry "come-back, come-back, come-back," is a descendant of the common helmeted form, of which type there are eight distinct species. Besides these are four crested species; one very beautiful species known as the VULTURE LIKE GUINEA-FOWL; and one, the rarest of all, known as the BLACK GUINEA-FOWL. Even in the British Museum, writes Mr. Ogilvie Grant, "there are only two examples of it, and neither of these are perfect specimens." It was discovered by M. Du Chaillu. "One day," he says, "I went out hunting by myself, and, to my great joy, shot another new bird, a black wild-fowl, one of the most singular birds I have seen in Africa. . . . The head, where it is bare, is in the female of a pink hue, and in the male of a bright scarlet. . . . Wild they are, and most difficult to approach, and rare, even in the forests where they are at home." They do not travel in huge flocks, like other guinea-fowls, but a male and two females at most.

The familiar form of the TURKEY scarcely needs description; but most people are probably puzzled by its name. Why Turkey? The bird is a native of America, so it certainly cannot have anything to do with its place of origin. Professor Newton has it that it is on account of its call-note, "to be syllabled 'turk, turk, turk,' whereby it may almost be said to have named itself."

The domesticated turkey is descended from the MEXICAN TURKEY, and was probably introduced into Europe during the sixteenth century. This, according to Captain Bendire, is a mountain-living species, and still abundant in the wilder portions of Western Texas and New Mexico. It appears to attain greater bulk than its domesticated descendant, Captain Bendire having recorded a specimen shot by himself which weighed 28 lbs. after having been drawn, and heavier birds are said to occur occasionally.

The Mexicans say that the coyotes catch turkeys by running in circles under the tree in which they are roosting, till the birds get dizzy with watching them, and fall down into the open mouths below!

There are three distinct kinds of turkey — the MEXICAN, AMERICAN, and HONDURAS TURKEY. The last is a very fine bird, with a bright blue head and neck, instead of red. The top of the head is adorned with numerous scarlet, berry-like warts, looking like holly-berries.

The BOB-WHITES, which belong to the group of tooth-billed game-birds known as American Partridges and Quails, demand a brief reference here. The species represented in the illustration on page 399 is common in the lowlands of Texas. It is a very unsuspicious bird, and in consequence falls an easy prey to foxes, hariers, and rattlesnakes, the last-named being the worst enemies, as many as five of these unfortunate birds having been taken at one time from the stomach of one of these monsters, and on another occasion a female and half a dozen of her eggs were similarly discovered.

WILD TURKEY.
(Meleagris gallopavo).
½ Life-size.

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The MEGAPODES and BRUSH-TURKEYS, though dull and uninteresting-looking birds, are, on account of the facts connected with the propagation of their species, quite remarkable. They do not brood over their eggs, as do other birds, but instead bury them, either in sand in the neighbourhood of warm springs or in heaps of decaying vegetable matter. In the latter case the material is often collected by several birds working together. Mounds of 8 feet high and 60 feet in circumference have been found, the work of the NICOBAR MEGAPODE. Such have been many years in use, material being added each season. Into this mass the female digs down and deposits an egg every second day, covering it up as soon as laid. There it remains till hatched, when the young, probably aided by its mother, forces its way up to the surface, and emerges, *not* a downy nestling as one would expect, but clothed with feathers differing but slightly in texture from those worn in the adult state. Owing to the precocious development, young megapodes are able to fly within an hour after birth.

There are many different kinds of megapodes occurring in Australia, Samoa, and the Nicobar and Philippine Islands.

Photo by Scholastic Photo. Co.]

RAZOR-BILLED CURASSOW

So called from the sharp ridge along the top of the beak

Photo by Scholastic Photo. Co.]

CRESTED CURASSOW

So called from its crest of curled feathers

The CURASSOWS and GUANS are very handsome birds, but probably quite unknown to most of our readers, yet they may always be seen in Zoological Gardens. They are closely related to the megapodes, which we have just been discussing; but their nesting habits are quite different. They lay their eggs in nests, either on the ground or in trees, and brood over them like other birds. Many have brilliantly coloured bare skin on the head and handsome crests. They are natives of Central and South America, where they are often kept by the settlers, as they tame easily. It is said that one of the guans, when crossed with the domesticated fowl, becomes intensely pugnacious, and superior to the game-cock for fighting purposes.

BUSTARD-QUAIL AND PLAIN-WANDERERS

These are small and quail-like in appearance, though they are probably only distant relatives of the Game-birds. But they are, nevertheless, remarkable birds. A great authority, Mr. A. O. Hume, writing of the INDIAN BUSTARD-QUAIL, says of them: "The most remarkable point in the life-history of these bustard-quails is the extraordinary fashion in which, amongst them, the position of the sexes is reversed. The females are the larger and handsomer birds. The females only call, the females only fight — natives say that they fight for the males, and probably this is true. The males . . . only . . . sit upon the eggs, the females meanwhile larking about, calling, and fighting, without any care for their obedient mates; and, lastly, the males tend . . . the young brood."

The group has a wide geographical range, occurring in Europe, Africa, Madagascar, South Asia, the Indian Archipelago, and Australia.

The Hoatzin

This bird is one of the puzzles of the ornithologist. Its pedigree is still a mystery, but it is generally believed to have some relation to the Game-birds. Its whole life is passed in trees overhanging water, and its flight restricted to short journeys from tree to tree. In South America, its home, it is known by a variety of names, one of which means Stinking-pheasant. This is in allusion to the peculiar odour of its flesh, which smells, according to some, like musk, and to others like raw hides. Another remarkable feature of this bird is the fact that it has turned its crop into a sort of gizzard, whilst the true gizzard, having been relieved of its functions, has diminished to the size of a hazel-nut. The unusual purpose to which the crop has been put has brought about considerable modification in the form of the breast-bone, which is quite different to that of any other bird.

Photo by J. W. McLellan [*Highbury*

HOATZIN

This is a native of the Amazons Valley, and lives entirely in the trees

The young of these birds are quite as remarkable as the parents, for almost as soon as they are hatched they crawl out of the nest, along the boughs of the tree in which it rests, to meet the parents coming with food. In these crawling excursions they are aided by the wings, which for a time serve as fore feet. The thumb and first finger are armed with strong claws, with which a firm hold is gained on the bark of the tree. To render these claws effective so long as they are necessary, the quill-feathers of the tip of the wing have their development checked till the others have grown long enough to serve the purposes of flight.

The Rails

The Rails are all water-loving birds, dwelling in swamps or on the borders of lakes and streams. Although all swim easily, none have webbed feet. The flight is weak; several species, indeed, have lost this power altogether. The body is much compressed, enabling them to pass readily through the narrow interspaces of dense aquatic foliage. The Rails appear to be related on the one hand to the Game-birds, and on the other to the Cranes. In size they vary from a bird as large as a fowl to one as small as a lark.

One of the commonest of the Rails is the Corn-crake, more commonly, perhaps, known as the Land-rail. Its curious grating cry is one of the commonest sounds which the summer brings with it, and one possessing a charm of its own. But rarely seen, it builds its nest in hay-fields, and, when the grass is being cut, sits so closely on its treasures that it is sometimes beheaded by the swinging scythe. In the autumn it falls not infrequently to the sportsmen when partridge-shooting. The corn-crake leaves in the winter for the more congenial climate of Africa, a feat that seems wonderful when its feeble powers of flight are considered. Its near relative the Water-rail is rather a handsome bird, but of shy and retiring habits.

The Weka-rail, a native of New Zealand, is one of the flightless forms to which we

have referred. It is about as large as a pheasant, but lacks its splendour, being soberly clad in brown and black. Unlike its relative, it breeds in a burrow, which it digs for itself by the aid of its bill. The name "weka" was given it by the Maoris.

Photo by Scholastic Photo. Co. [*Parson's Green*

WEKA-RAIL

The wings, though fairly large, are useless for flight

The COMMON WATER-HEN, or MOOR-HEN, is one of the most familiar birds of the London parks. Although frequent enough to be seen upon streams and broads, it is, nevertheless, shy and wary; but in the sanctuary of the public parks all reserve is thrown off. The water-hen, like its allies, is an expert swimmer, in spite of the fact that the toes are not webbed; on the contrary, they are very long and slender. When alarmed, these birds will often submerge the body till only the beak projects above water.

All the members of this group are easily recognised by the bare patch of skin extending from the beak on to the top of the head. In the COOTS this is white; in the WATER-HENS and GALLINULES it is red. The coots and water-hens are clad in sober colours, grey or black; but the gallinules are gorgeously clad in purple, shaded with dark green, olive-brown, and black. MANTELL'S GALLINULE of New Zealand is probably now extinct, the last bird having been killed in 1898.

Photo by W. F. Piggott] [*Leighton Buzzard*

WATER-RAIL

This is a common British bird, seldom seen, on account of its retiring habits

THE FIN-FEET

These are little-known birds, found in Africa, South America, South-east Asia, and Sumatra. They are closely related to the coots, but differ therefrom in many important particulars. Like the coots, they are river-haunting birds, and have broad flaps of skin fringing the toes, which serve the purpose of a web; but they have much longer necks and tails than the coots and water-hens. Not much is known about them.

CHAPTER III

PIGEONS AND SAND-GROUSE

PIGEONS, as a rule, are birds of wonderful powers of flight. The young, which never exceed two in number, are hatched perfectly blind and helpless, and but sparsely clothed. They are nourished by a peculiar milky secretion of the parents' crop known as "pigeons' milk." The operation of feeding is performed by the parent thrusting its beak into the mouth of its offspring and ejecting therein the secretion just referred to. The nest is a very simple structure, being composed of twigs, generally placed in a tree, but sometimes in a cave or hole in a bank. The eggs, which never exceed two in number, are pure white.

Perhaps the most beautiful species occur among the large group known as FRUIT-PIGEONS. Many of these are invested in raiment of vivid green and yellow, forming a little coterie by themselves — the GREEN PIGEONS. Others, on account of their brilliancy, have been designated PAINTED PIGEONS, of which, perhaps, the most beautiful of all is EUGÈNE'S PIGEON. Try to imagine it! The head is pure white, the upper part of the breast a purple-red surrounded by a dull purple band: the under parts are greyish green, shading into white; the flanks green; whilst the upper parts are also green, but of a rich bronze tint. Another group from the Fiji Islands includes a magnificent species, the male of which is clothed in a glorious orange, save the head and throat, which are olive-yellow. His mate is scarcely less beautiful, her plumage being rich green. Another member of the group — the WHITE NUTMEG-PIGEON — is clad in creamy white, with black quills, and a black tip to the tail. It is a native of Borneo. The fruit-pigeons, it should be mentioned, include some of the largest of living pigeons.

Photo by J. T. Newman] [*Berkhamsted*

A PAIR OF YOUNG PIGEONS IN NEST

The hair-like down of the young pigeon is quite different to any other nestling down

Whilst many of the Pigeon Tribe seem to have succeeded in dyeing their feathers with all the hues of the rainbow, others have secured equal glory by a covering which at first sight would rather appear to be of burnished metal than of feathers. The most striking instance of this is found in the magnificent NICOBAR PIGEONS. There are two species of these birds, which occur not only in the Nicobar Islands, from which they take their name, but also in the Malay Archipelago and the Solomon and Pelew Islands. The general tone of the one species is black, but the upper parts are superbly glossed with bronze and copper reflections. The other, from the Pelew Islands, is indigo-blue in general tone. In one of the Nicobar Islands these birds occur in thousands. Furthermore, these two pigeons stand alone, in that the neck-feathers are greatly elongated, forming "hackles" like those of the common fowl.

The largest of living pigeons are the GOURAS, or CROWNED PIGEONS. There are six species,

Photo by L. Medland, F.Z.S. [*North Finchley*

SOUTHERN FRUIT-PIGEON

The flesh of the fruit-pigeon surpasses that of all other birds in delicacy

Photo by L. Medland, F.Z.S. [*North Finchley*

NICOBAR IMPERIAL FRUIT-PIGEONS

These birds lay but a single egg, which is large

Photo by W. P. Dando, F.Z.S.

NEW GUINEA CROWNED PIGEON

This is the largest of living pigeons

Photo by W. P. Dando, F.Z.S.

WONGA-WONGA PIGEON

This bird is found in the brush country of Eastern Australia

all of which are confined to Australasia. They are characterised by a huge and very beautiful fan-shaped crest of feathers which springs from the crown of the head.

At the other extreme stand the NAMAQUA and SCALY DOVES. The former is regarded by Professor Newton as one of the most graceful in form of all the Pigeon Tribe: the latter are scarcely, if at all, larger than the sparrows.

The power of flight of some forms is, however, extremely limited; they bid fair in course of time to become flightless, like the dodo and the solitaire. The most interesting of these is the GREY-NAPED GROUND-PIGEON. Pigeons for the most part display a marked preference for a life among the trees rather than on the ground; but there are some which are essentially ground-dwellers. The species in which this changed habit is most deeply rooted, and probably of longest standing, exhibit one very interesting point of difference from their neighbours of the woods. This difference consists in the very considerably longer legs which mark the ground-haunting bird. The GREY-NAPED GROUND-PIGEON of South-east New Guinea forms an excellent example, inasmuch as the legs are much longer than in any other pigeon. These birds (for there are three species in all) resemble the Megapodes in habit, and frequent hills or dense thickets. They lay one egg, which is deposited at the foot of a tree.

Among domesticated breeds is the ENGLISH POUTER, a bird characterised by its enormous gullet, which can be distended with air whenever the owner wills. The carriage of the body is vertical, not, as in pigeons generally, horizontal. The CARRIER is a breed illustrating the result of long-sustained selection to increase, amongst other characters, the development of the bare skin surrounding the eye and beak of all pigeons, wild or tame. In the SHORT-FACED TUMBLER we have a breed wherein those birds with the shortest beaks have been steadily bred from. To-day so little beak is left that some individuals are hatched which, when grown up, are unable to feed themselves. An example of a radical change in the feathers is the INDIAN FRILL-BACK. In this case the feathers all over the body are reversed, or turned forwards, giving the bird a quite extraordinary appearance. In the JACOBIN we have a breed — and we could cite others — wherein the feathers of the neck are much elongated, and turn upwards and forwards over the head to form a hood.

Photo by L. Medland, F.Z.S. [*North Finchley*

MALE BLACK-BELLIED SAND-GROUSE

Young sand-grouse run directly they are hatched, thus differing from young pigeons

In general appearance SAND-GROUSE are small, very short-legged birds, with small heads and pointed wings and tail. Their general tone of coloration may be described as sand-coloured, and this has been adopted to render them in harmony with the barren sand-wastes in which they dwell. But some may be described as quite highly coloured, being banded and splashed with chestnut, black, pearly grey, white, and yellow, according to the species.

PALLAS'S SAND-GROUSE is a native of the Kirghiz Steppes, extending through Central Asia to Mongolia and Northern China, and northwards to Lake Baikal, and southwards to Turkestan. Here they may be met with in enormous numbers. In North China large numbers are often caught after a snow-storm. The snow is cleared away, and a small green bean is scattered about. Young sand-grouse differ remarkably in one particular from young pigeons, inasmuch as the former are hatched covered with a thick down, and are able to run about soon after leaving the egg, whilst the pigeon comes into the world very helpless and much in need of clothing. Three eggs are laid by the sand-grouse, and these are double-spotted; whilst the pigeon lays but two, which are white. The eggs of the sand-grouse are laid in a depression in the ground, without any nest.

CHAPTER IV

AUKS, GULLS, AND PLOVERS

THE AUK TRIBE

THE GUILLEMOT is found all around Britain, and breeds wherever the sea is fringed by cliffs affording ledges for the reception of the eggs. It breeds in colonies often numbering many thousands, and lays but one egg, which is large and pear-shaped. Since the guillemot builds no nest, but lays its egg on the bare rock, this peculiar shape is advantageous, since it revolves on itself, when disturbed, instead of rolling off the ledge into the sea. At the same time thousands of eggs fall into the sea every year owing to the bird's leaving the egg, whilst incubating, in too great a hurry. At Lundy Island one of the sources of amusement for the gaping tourist was that of firing a shot to frighten the birds, with the result that, at each shot, showers of eggs were knocked off the ledges on to the rocks below. The colour of the egg varies infinitely, no two being quite alike. This, it has been suggested, is useful, as the mother is thereby enabled to identify her own egg, even when surrounded by hundreds of others. The young are covered with long down, and when big enough, but still unable to fly, are taken down by the mother to the sea, being carried, some say, on her back: others say the chick is seized by the wing and carried down.

By permission of the Hon. Walter Rothschild, Tring

WHITE TERN

There are two species of white tern, almost restricted to the Southern Hemisphere

The RAZOR-BILL is nearly, if not quite, as common on the coasts of Britain as the guillemot, from which it may be readily distinguished by its beak, which is much compressed from side to side — hence its name of Razor-bill — and deeply grooved. In habits it very closely resembles the guillemot, but in one respect at least it is a more interesting bird, inasmuch as it is related to and closely resembles the now extinct GREAT AUK, the giant of the tribe. The smallest British representative, it should be mentioned, is the LITTLE AUK, a species more nearly allied to the guillemot. It is only a winter visitant to Britain, breeding in huge colonies on the inhospitable shores of Greenland and Iceland.

So quaint a bird as the PUFFIN most certainly finds a place here. One of its most characteristic features is its enormous bill, which is rendered more conspicuous on account of its bright colour. It is bluish at the base, yellow at the tip, and striped with orange. A very remarkable feature of this bill is the fact that it is larger in summer than winter, portions of the sheath being shed in autumn.

Enormous numbers of puffins breed in Ireland; myriads breed on Lundy Island. The Farne Islands, the cliffs of Flamborough, and Scotland are also tenanted by thousands. Puffins breed in holes, which they dig for themselves when occasion requires, but when rabbit-burrows are to be had they prefer these, dispossessing the owners without the slightest compunction. Might, with the puffin, is right, as well as with many other animals.

Young puffins, like young auks and guillemots, are hatched covered with long down. The parents feed them on fish, which they deposit at the mouth of the burrow twenty at a time, and give them to the young bird one by one. When the female is sitting, her mate feeds her in a similar way.

Puffins lay only a single egg, which differs from that of its relatives the Auks and Guillemots in being white. The white colour enables the sitting-bird to see it in the dark burrow.

THE GULL TRIBE

To get at the real inwardness of the Gull Tribe, so to speak, we must examine their anatomy very closely; then we shall be convinced that they are modified Plovers, and have nothing to do with the Petrels, to which they bear an undoubted resemblance.

Photo by G. Watmough Webster & Son [*Chester*

TERNS ON A SHINGLE BANK

Terns lay their eggs among the shingle; from their coloration, these are difficult to detect among the surrounding stones

TERNS

Terns are gulls in miniature, on which account it is probable that many a visitor to the seashore passes them unwittingly. But let him watch next time for what look like flocks of tiny, long-winged, and unusually active gulls, now hovering gracefully in the air, and now suddenly plunging headlong like an arrow to the sea, with a force and dash that will surprise him, now that attention is drawn to them. These are terns. From their vivacity and forked tails, they have been aptly named Sea-swallows.

There are several species of tern. Like the Gulls, they have a distinctive dress for summer and winter, but the sexes are both dressed alike. The general livery, as with the Gulls, is pearly grey above and pure white below — in summer, in some species, relieved by a black head. One species, the ROSEATE TERN, has the breast suffused with a most exquisite rose-pink, which fades rapidly after death, however. Young terns, in their first plumage, differ conspicuously from their parents, having much brown intermixed with grey.

Terns lay about three eggs, which are deposited among the shingle on the beach; and so closely do the eggs, and later on the young, resemble the surrounding stones that it is almost impossible to find them. As a rule terns breed in colonies, often numbering many thousand birds.

There are exceptions to the rule just laid down as to nest-building. One species of the NODDY TERNS, for example, builds a nest of turf and dry grass, placed in bushes or in low trees. It seems to return to the same nest year after year, adding on each return new materials, till they form masses nearly 2 feet in height. Occasionally it appears to make a mud-nest, placed in the fork of a tree; whilst the superb little WHITE NODDY often deposits

its egg on the leaf of a cocoanut-palm — truly a wonderful site, and still more wonderful when we reflect that it is chosen by one of the Gull Tribe.

About six species of tern commonly occur in the British Islands, and some five or six other species occasionally visit them.

Skimmers

The Skimmers are tern-like birds, with a very wide geographical distribution, occurring in India, Africa, and North and South America, and remarkable for the very extraordinary form of the beak. The upper jaw is much shorter than the lower, and both are compressed to the thinness of a knife-blade. This beak is associated with, and is probably an adaptation to, an equally remarkable method of feeding, which has been admirably described by Darwin, who watched them feeding in a lake near Maldonado. "They kept their bills," he says, "wide open, and the lower mandible half buried in the water. Thus skimming the surface, they ploughed it in their course; . . . and it formed a most curious spectacle to behold a flock, each bird leaving its narrow wake on the mirror-like surface. In their flight . . . they dexterously manage with their projecting lower mandible to plough up small fish, which are secured by the upper and shorter half of their scissor-like bills."

Photo by Scholastic Photo. Co. [*Parson's Green*

HERRING-GULL

So called from its habit of following the shoals of herrings

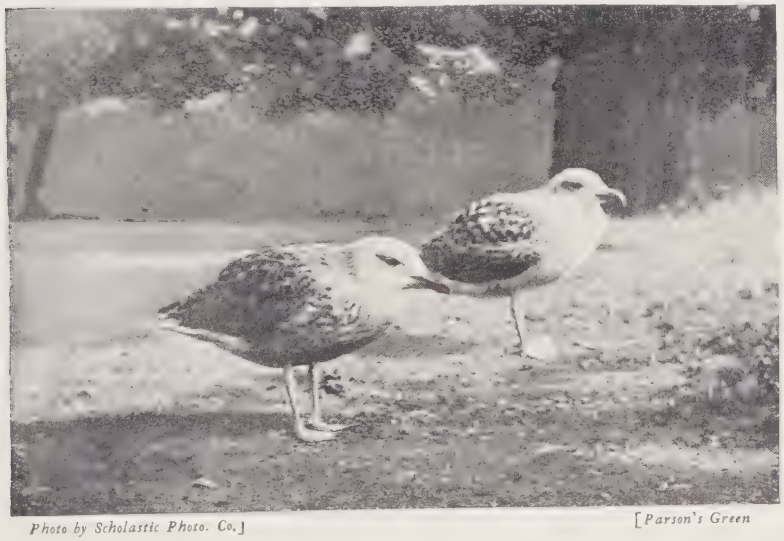

Photo by Scholastic Photo. Co. [*Parson's Green*

YOUNG HERRING-GULLS IN THE GREY PHASE OF PLUMAGE

In their dull grey plumage the young of all gulls are very unlike the adults

The Gulls

Gulls are larger and heavier birds than terns, with longer legs, and shorter, thicker beaks. Furthermore, with one exception, the tail is never forked. Like the terns, gulls generally breed in colonies, and these are often of large size. Young gulls, when newly hatched, are quite active. Later, when their feathers have grown, they are found to wear a dress quite different from that of the parents. Sometimes the adult plumage is gained at the end of the first year of existence, sometimes not until after the third year. Gulls feed on everything that comes in their way, from fish caught swimming at the surface of the sea to worms picked up at the plough-tail.

One of the commonest and best known of all the gulls is perhaps the species known as the Black-headed Gull, which has become so common in the heart of busy London, where hundreds may be seen, during the winter months, flying up and down the river, or

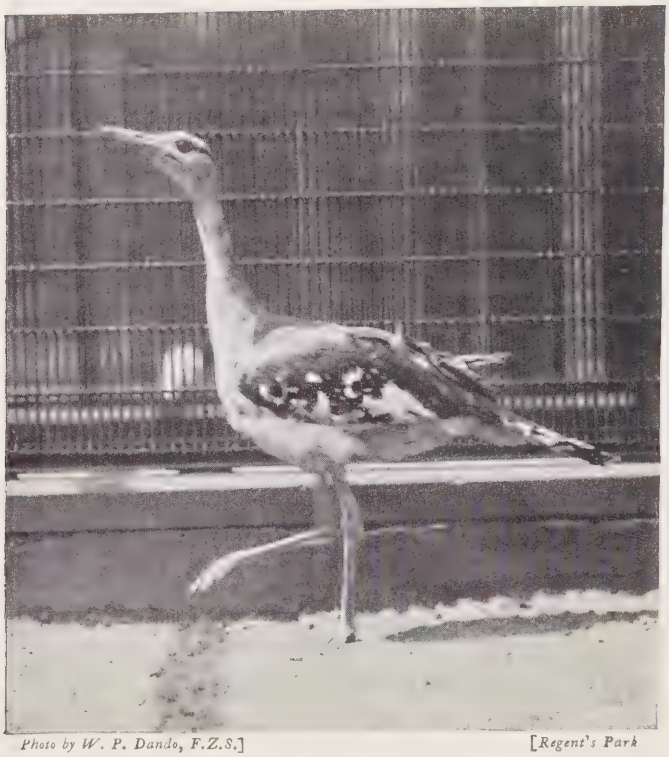

Photo by W. P. Dando, F.Z.S. [*Regent's Park*

DENHAM'S BUSTARD

This species, when "showing off," fills the gullet with air, having no special air-sac like the great bustard

RUFF. The importance of this exception is still further increased by the fact that the change in coloration is accompanied by the development of a large frill around the neck, surmounted by two large tufts called "ears," and fleshy, brightly coloured warts around the beak. The coloured picture of the male in its spring dress, which will be found on another page, gives an admirable idea of the typical ruff, but it must necessarily fail to give any indication of one very remarkable fact concerning this frill and the two "ears," and for this reason — no two individuals ever have these peculiar feathers of the same coloration and pattern. The range of colour is certainly not great — the changes being rung, so to speak, on black, white, chestnut, bay, and ash-colour. Diversification is gained by contrasting the "ears" with the frill, and adding bars or streaks to the light coloration, and purple, green, and violet reflections to the dark. These ornaments are donned in a surprisingly short space of time, and are discarded as quickly, for they are scarcely completed by the month of May, and are thrown off again at the end of June. During the time that this resplendent livery is worn the males engage in mimic battles — which may occasionally develop into real ones — arranged apparently for the edification of the females, which, it seems, select as partners, at least for that season, those which please or excite most. This power of pleasing must certainly be considerable, for the ruff is a polygamous species.

Formerly the ruff was a common bird in England, but the drainage of the fens and persecution have practically brought about its extermination.

At least two groups of plovers have succeeded in reversing the usual order of things in the matter of sexual plumage. These are the PHALAROPES — which are British birds — and the PAINTED SNIPE, in both of which the female is more brightly coloured and somewhat larger in size than the

Photo by W. F. Piggott] [*Leighton Buzzard*

GREAT BUSTARDS

The cock on the right is "showing off"

Photo by Ottomar Anschütz, Berlin.

CROWNED CRANE.

The feathers of the Crest of this bird look not unlike stiff hairs.

male. As is the case where this reversal occurs, the duties of incubation fall mainly or entirely upon the smaller and duller male. It is interesting to note, furthermore, that only in the phalaropes is there a seasonal change of plumage: in the painted snipe the same livery is worn all the year round.

Many of the plovers have no seasonal change of plumage, but both male and female wear all the year round, some a more or less markedly bright-coloured livery, as the DOTTEREL and TURNSTONES, others a more sober vestment, as the CURLEWS and SNIPE, for example.

The SNIPE and WOODCOCK may be cited as especially instructive forms in this connection, showing, in regard to the beak, for instance, undoubted proof of this structural modification, the result of adaptation to the peculiar method of seeking their food. This beak constitutes an organ of touch of great sensitiveness, and is used as a probe, to thrust down into the soft soil in the search for hidden worms.

Photo by Billington] *[Queensland*

INDIAN BUSTARDS

Bustards have very short toes, like many other birds which walk much on sandy soil

Of the three species of snipe which occur in Britain, probably the one known as the COMMON SNIPE is most familiar; but it will, perhaps, be new to some to learn that this bird ranks as a musical performer, on account of a very extraordinary "bleating" or "drumming" noise which it gives forth, especially during the spring of the year — the season of courtship. We cannot describe this noise better, perhaps, than as an unusually high-pitched "hum," produced, it is generally held, by wind driven between the outer tail-feathers by the rapid vibration of the wings as the bird descends, or rather pitches, at a fearful pace, earthwards. These feathers have the shafts peculiarly thickened; and it is interesting to note that the characteristic sound may be artificially produced if they be fastened to a stick and rapidly whirled through the air.

The snipe and woodcock are not the only members of the Plover Tribe whose beaks have undergone marked structural modifications; indeed, many instances could be cited, but two or three must suffice. In the AVOCET the beak turns upwards like an awl, and the bird is in consequence known in some places as the COBBLER'S-AWL DUCK. In one particular, however, the beak differs from an awl, tapering as it does to an exceedingly fine point. When the

Photo by W. P. Dando [*Regent's Park*

STANLEY CRANE

This is a South African species

bird feeds, it walks along in shallow water with the curved tip of the beak resting on the surface and the head moving swiftly from side to side, the jaws meanwhile being opened and closed with exceeding rapidity, and seizing instantly upon such small crustacea and other organisms as come in their way.

Although all the Plovers might be described as long-legged birds, the STILTS are quite exceptionally so, and afford evidence of modification in another direction. Relatively to the size of the body, the stilts have the longest legs of all living birds. They seek their prey by wading in shallow water, like the Avocets, to which they are closely related. One species — the BLACK-WINGED STILT — occasionally appears in Britain.

Some other members of the Plover Tribe — the JACANA of Brazil, and the WATER-PHEASANT of India, Ceylon, and China, for example — have enormously long toes, as well as claws of great length.

These birds are furthermore remarkable for the possession of formidable weapons of offence, borne on the wrist-joint of the wing, in the shape of long, sharp, and powerful spurs. Similar weapons are carried by certain plovers — the EGYPTIAN SPUR-WINGED PLOVER, for instance.

CHAPTER V

BUSTARDS AND CRANES

THE Plover Tribe, Bustards, Cranes, and Rails form a large group of diverse but probably closely related forms.

Of the Bustards, the most interesting and important species is the GREAT BUSTARD. About a hundred years ago this magnificent bird might have been seen any day in such favoured localities as the Yorkshire and Lincolnshire wolds, the Norfolk and Suffolk "brecks," the heaths of Newmarket, or the downs of Berkshire and Wiltshire. It owes its extermination to several causes, foremost among which must be reckoned the reclaiming of waste land and improved methods of agriculture. "The bulk of its body," says Professor Newton, "renders it a conspicuous and stately object; and when on the wing, to which it readily takes, its flight is not inferior in majesty to that of the eagle." The expanse of the outstretched wings of a great bustard is 8 feet, or even more; and the weight of the male may even exceed 35 lbs. The female is smaller.

Photo by Ottomar Anschütz] [*Berlin*

COMMON CRANE

This handsome bird used to breed in Britain till the end of the sixteenth century

Photo by Scholastic Photo. Co., Parson's Green

MANCHURIAN CRANE

The piebald plumage of this species is distinctive

between the gullet and the skin with air through a small hole under the tongue. For many years it was believed this bag was used as a sort of water-bottle, to enable the bird to live amid the arid wastes which were its chosen haunts. We now know what its real use is. Visitors to the Natural History Museum in London will find, beautifully mounted, a male bustard "in the act of showing off," as it is called, and hard by a dissection of the head and neck, showing this wonderful wind-bag.

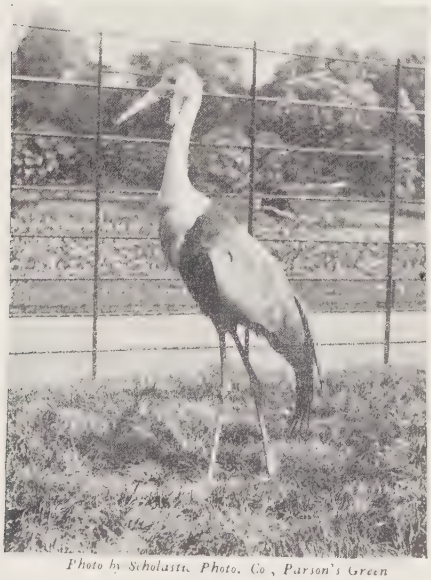

Photo by Scholastic Photo. Co., Parson's Green

WATTLED CRANE

So called from the pendent lappets of the throat. It is a South African species

To see the great bustard in a wild state to-day, one would have to travel to Spain. And if one could make a pilgrimage for this purpose during the birds' courting-season, some very wonderful antics on the part of the male would be witnessed. These antics make up what is really a very elaborate love-display. In this performance the bird inflates his neck with wind, draws his head closely down on to the back, throws up his tail, so as to make the most of the pure white feathers underneath, and sticks up certain of the quill-feathers of the wing in a manner that only a great bustard can. Certain long feathers projecting from each side of the head now stand out like the quills of the porcupine, forming a sort of *cheval-de-frise* on either side of the head, and complete the picture, which, in our eyes, savours of the ludicrous. The inflation of the neck is brought about by filling a specially developed wind-bag

Photo by Scholastic Photo. Co.] *[Parson's Green*

COMMON CRANE

The note of the crane is sonorous and trumpet-like

Cranes

One of the most beautiful of this group of peculiarly handsome birds was once numbered among British birds; now, alas! like the bustard, it is one of the rarest visitors. Till the end of the sixteenth century the Common Crane reared its young in the fen-lands. In Saxon times we read of a request being made by King Ethelbert to Boniface, Bishop of Mayence, begging him to send over two falcons suitable for flying at the cranes in Kent. In one case, at a feast given by Archbishop Neville in the reign of Edward IV., as many as

204 cranes figured in the menu. Later, it is interesting to note, they seem to have fallen somewhat into disfavour, since we read of a Dr. Muffet, of Wiltshire, somewhere about 1570, declaring cranes to be "distinctly unfit for sound men's tables. . . . Yet being young, killed with a goshawk, and hanged two or three days by the heels, eaten with hot gelentine, and drowned in sack, it is permitted unto indifferent stomachs."

Photo by Scholastic Photo. Co. [*Parson's Green*

SERIEMA

A South American bird, at one time supposed to be related to the birds of prey

The nest is placed on the ground, and contains from two to three eggs. The young are covered with down, and, like plovers and bustards, run as soon as hatched.

The cranes, like many other birds, notably some of the Plover Tribe, occasionally indulge in spirited outbursts of dancing. Mr. Nelson, writing of the birds of Alaska, tells how one day he was watching two cranes enjoying themselves in this manner. The male suddenly "wheeled his back towards the female and made a low bow, his head nearly touching the ground, and ending by a quick leap into the air. Another pirouette brought him facing his charmer, whom he greeted with a still deeper bow, his wings meanwhile hanging loosely by his side. She replied by an answering bow and hop, and then each tried to outdo the other in a series of spasmodic hops and starts, mixed with a set of comically grave and ceremonious bows."

Cranes vary much in general appearance. Some species have much of the skin round the head bare and brilliantly coloured, such as the SARUS CRANE of India and the CROWNED CRANE.

The WHITE and WHOOPING CRANES are birds of wondrous beauty. The first-named species has been not inaptly called the "lily of birds." The whole plumage, with the exception of the black quills, is white. The legs are red, as is also the face. Dr. Coues, an American ornithologist of great repute, relates how he once mistook one of these birds — the WHOOPING-CRANE — for an antelope. He and a companion saw what they "took to be an antelope standing quietly feeding, with his broad white stern toward us, and only about 500 yards off. We attempted for at least fifteen minutes to 'flag' the creature up to us, waving a handkerchief on a ramrod. . . . This proving unavailing, my friend proceeded to stock the game, and crawled on his belly for about half the distance before

Photo by L. Medland, F.Z.S. [*North Finchley*

WHITE-BACKED TRUMPETERS

The trumpeters are very aberrant members of the Crane Tribe

Photo by W. F. Piggott] *[Leighton Buzzard*

GREAT CRESTED GREBE

Young grebes in down are beautifully striped

the 'antelope' unfolded his broad black-tipped wings and flapped off, revealed at length as a whooping (white) crane."

Another very remarkable species is the CROWNED CRANE. This is an African species, and takes its name from the tuft of curiously modified feathers on the top of the head. The coloured plate gives a good idea of its general appearance.

THE SERIEMA

This is a very hawklike-looking bird; indeed, by some ornithologists it has been regarded as closely allied to the Hawks and Eagles, and more especially to the Secretary-bird (page 467). Really, however, it is a very ancient kind of crane.

The TRUMPETERS, the COURLANS, the KAGU, and the SUN-BITTERN are other ornithological puzzles. Concerning the precise affinities of these birds much is yet to be learnt; they are, however, undoubtedly related to the Cranes. The last mentioned is a small bird, with wonderfully beautiful wings, which it displays with great effect to its mate during the courting-season.

CHAPTER VI

GREBES AND DIVERS, PENGUINS, AND TUBE-NOSED BIRDS

THE GREBES AND DIVERS

THE Grebes and Divers are representatives of an exceedingly ancient type, and are in many ways besides very interesting. Both are common British birds. The greater part of their lives is spent upon the water, and to suit this aquatic existence their bodies are specially modified. One of the principal features of this modification is seen in the position of the legs. These, by a shortening of the thigh-bones in the grebes, leave the body so far back that when the bird walks the body is held vertically. With the divers walking has become an impossibility, and they can only move on land on their bellies, pushing themselves along with the feet. Both grebes and divers

Photo by W. F. Piggott] *[Leighton Buzzard*

BLACK-THROATED DIVERS

These very handsome birds breed in Scotland

Photo by G. W. Wilson & Co., Ltd. [*Aberdeen*

ROCK-HOPPER PENGUIN

The name Rock-hopper is given in allusion to the habit of hopping over boulders of rock

Photo by W. P. Dando, F.Z.S. [*Regent's Park*

BLACK-FOOTED PENGUIN

This bird, also known as the Cape or Jackass-penguin, breeds in burrows or under ledges of rock

are expert swimmers, and dive with the greatest ease, remaining long under water. The grebes haunt ponds, lakes, and broads; the divers prefer the open sea. Both feed on fish.

GREBES

Of the numerous species of grebe, the most familiar are the GREAT CRESTED GREBE and the little DABCHICK. The former has suffered grievous persecution for the sake of its beautiful breast-feathers, which Fashion decreed should be worn by the gentler sex in the form of muffs or hats. Thus a price was set upon the head of this beautiful and harmless bird, and its ranks were speedily thinned. Some species wear during the nesting-season beautiful chestnut or golden "ears," "horns," or "frills" on the head and neck. The EARED GREBE is especially magnificent at this time.

DIVERS

These, as already remarked, are sea-loving birds, but they breed inland on the shores of lakes. There are not many species of divers, but, like the grebes, they assume a special dress during the nesting-season, more beautiful than the winter dress.

THE PENGUINS

THE PENGUINS may justly be called wonderful birds, and they are undoubtedly of very ancient descent. For countless generations the sea has been their home and refuge, and, in consequence, flight has been abandoned in exchange for increased swimming-powers, which have been gained by transforming the wing into a paddle. This transformation has resulted in flattening the wing-bones — and so increasing the surface of the hand and arm whilst reducing its thickness — and the suppression of the quill-feathers. The result is a blade-like paddle closely resembling the paddle of the whale, the turtle, or the extinct fish-lizards. With this organ they cleave their way through the water, often far below the surface, in pursuit of food, just as of old their ancestors did through the air. In other diving-birds the wings are kept closely pressed to the side of the body when under water, whilst the locomotion is effected by the feet. The penguin's legs, in consequence of diminished use, have shortened considerably. But besides the wings and legs, the feathery covering has also undergone a certain amount of change. This has been effected by increasing the size of the shaft of the feather and diminishing the vane; as a result, on the front part of the wings these feathers look more like scales than feathers.

Professor Moseley has vividly described the appearance of a flock of penguins at sea. He writes from Tristan d'Acunha: "As we approached the shore, I was astonished at seeing a

shoal of what looked like extremely active, very small porpoises or dolphins. . . . They showed black above and white beneath, and came along in a shoal of fifty or more . . . towards the shore at a rapid pace, by a series of successive leaps out of the water and leaps into it again. . . . Splash, splash, went this marvellous shoal of animals, till they went splash through the surf on to the black, stony beach, and then struggled and jumped up amongst the boulders and revealed themselves as wet and dripping penguins."

Like their relatives in other parts of the world, penguins breed in huge communities known as "rookeries," a rookery being peopled by tens of thousands. Their nests, made of small stones, are placed among the tall grass and reached by beaten pathways, exceedingly difficult to walk through. Professor Moseley thus describes a "rookery": "At first you try to avoid the nests, but soon find that impossible; then, maddened almost by the pain [for they bite furiously at the legs], stench, and noise, you have recourse to brutality. Thump, thump, goes your stick, and at each blow down goes a bird. Thud, thud, you hear from the men behind you as they kick the birds right and left off the nests; and so you go for a bit — thump, smash, whack, thud, 'caa, caa, urr, urr,' and the path behind you is strewn with the dead and dying and bleeding. Of course, it is horribly cruel thus to kill whole families of innocent birds, but it is absolutely necessary. One must cross the rookeries in order to explore the island at all, and collect the plants, or survey the coasts from the heights."

Penguins feed principally on crustacea, molluscs ("shell-fish"), and small fish, varied with a little vegetable matter. Although the legs are very short, penguins yet walk with ease, and can, on occasion, run with considerable speed. It would appear, however, as if the largest of the tribe, the EMPEROR-PENGUIN, had become somewhat too bulky to run; for when speed is necessary it lies down upon the snow and propels itself with its feet, traveling, it is said, in this manner with incredible speed.

Penguins, though confined to the Southern Hemisphere, enjoy a wide range and every variety of climate. They are found on the Antarctic ice, on the shores of South Africa, South America, Australia, New Zealand, and inhabit many islands of the southern seas,

Photo by Percy Ashendon [*Cape Town*

BLACK-FOOTED PENGUINS BATHING

The name Jackass is bestowed because the noise made by these birds closely resembles the bray of a donkey

Photo by W. P. Dando, F.Z.S.] [Regent's Park

KING-PENGUIN

This is one of the largest of the Penguins

notably the Falklands, Kerguelen, and Tristan d'Acunha. In size penguins vary greatly. The largest is the EMPEROR-PENGUIN of the Antarctic seas; scarcely smaller is the KING-PENGUIN of Kerguelen Island. The emperor-penguin stands some $3\frac{1}{2}$ feet high, and may weigh as much as 78 lbs The GENTLE PENGUIN, or "Johnny" of the sailors, is next in size, being but little smaller than the king-penguin; this species inhabits Kerguelen Island and the Falklands. The CRESTED PENGUINS, or ROCK-HOPPERS, of which there are several species, are much smaller; they occur in the Falkland Islands, New Zealand, and the Antarctic. The South African form is known as the BLACK-FOOTED PENGUIN. Its nearest allies are HUMBOLDT'S PENGUIN of Western South America, and the JACKASS-PENGUIN of the Falklands. The smallest of all is the little BLUE PENGUIN of South Australia and New Zealand, standing only 17 inches high.

THE TUBE-NOSED BIRDS

UNTIL recently these birds were believed to be closely related to the Gulls, but it is now generally agreed that they are really distant relatives of the Divers and Penguins. The association with the Gulls was pardonable, for they certainly bear a superficial resemblance to them. The birds now under discussion may be readily distinguished from the Gulls by the fact that the nostrils open into a tube on the top of the beak, or a pair of tubes, one on either side—hence the name of the group. Like the Gulls, they are sea-birds and web-footed. Their young are downy and for a time helpless. One egg is laid, which is white, and in some cases spotted with red at the large end. As a rule no nest is made, but the egg laid on the bare ground, in a hole or burrow or in crevices of rocks. The Albatrosses build a nest of earth, tufts of grass, and moss, the whole structure raising the sitting-bird well above the ground. The Giant and Fulmar Petrels also build nests. The albatross is said by Professor Moseley to hold the egg in a pouch while sitting, as in the case of the king-penguin. The nature of this pouch has never been described.

Although occurring in the seas of all parts of the world, the Southern Hemisphere must be regarded as their headquarters, since here the greatest number of species are found. All are carnivorous, and — with the exception of one small group, the Diving-petrels of the Strait of Magellan — are birds of powerful flight. A large number of species belong to this group, but an enumeration of all would be wearisome. A few of the more striking have, therefore, been selected for description.

THE ALBATROSSES

It was an albatross which brought such woe upon the ancient mariner whose pitiful story is so feelingly told by Coleridge. But the tables are occasionally turned, for men falling overboard in southern seas are liable to be attacked by these powerful giants. The albatross is mostly renowned for its majestic flight. Mr. Froude has given us a wonderful description

of this flight, which is quoted with approval by Professor Newton. It runs as follows: "The albatross wheels in circles round and round, and for ever round the ship — now far behind, now sweeping past in a long, rapid curve, like a perfect skater on an untouched field of ice. There is no effort; watch as closely as you will, you rarely or never see a stroke of the mighty pinion. The flight is generally near the water, often close to it. You lose sight of the bird as he disappears in the hollow between the waves, and catch him again as he rises over the crest; but how he rises and whence comes the propelling force is to the eye inexplicable: he alters merely the angle at which the wings are inclined; usually they are parallel to the water and horizontal; but when he turns to ascend or makes a change in his direction, the wings then point at an angle, one to the sky, the other to the water."

Professor Hutton, speaking with similar enthusiasm of the wonderful flight, gives us, however, another side to the picture. "Suddenly," he says, "he sees something floating on the water, and prepares to alight; but how changed he now is from the noble bird but a moment before, all grace and symmetry! He raises his wings, his head goes back, and his back goes in; down drop two enormous webbed feet, straddled out to their full extent; and with a hoarse croak, between the cry of a raven and that of a sheep, he falls 'souse' into the water. Here he is at home again, breasting the waves like a cork. Presently he stretches out his neck, and with great exertion of his wings runs along the top of the water for seventy or eighty yards, until, at last, having got sufficient impetus, he tucks up his legs, and is once more fairly launched in the air."

For the wonderful photographs of the albatross at home we are indebted to the Hon. Walter

By permission of the Hon. Walter Rothschild] [*Tring*

NESTING ALBATROSSES ON LAYSAN ISLAND

This colony was of enormous size, and included thousands of birds

Photo by D. Le Souef] [*Melbourne*

WHITE-CAPPED ALBATROSS ON EGG

Professor Moseley describes the egg of the albatross as being held in a sort of pouch

Rothschild. They are from his book on the avifauna of Laysan Island, in the North Pacific. Unfortunately for the albatrosses and other birds, traders have been attracted to Laysan for the sake of the guano deposits. The birds were strictly protected during the occupation of Mr. Preece, but when he left they had no friend to shield them, and their eggs were taken in cart-loads, as the accompanying photograph shows.

When an albatross makes love, Professor Moseley tells us, he stands "by the female on the nest, raises his wings, spreads his tail and elevates it, throws up his head with the bill in the air, or stretches it straight out forwards as far as he can, and then utters a curious cry. . . . Whilst uttering the cry the bird sways his neck up and down. The female responds with a similar note, and they bring the tips of their bills lovingly together. This sort of thing goes on for half an hour or so at a time."

There are several different kinds of albatross. The largest measures over 11 feet across the outstretched wings. They are inhabitants of the southern seas.

After the Albatrosses, the largest bird of the group is the GIANT PETREL. The sailors call it "Break-bones," "Nelly," or "Stinker." In habits it differs much from its aristocratic relative the albatross, haunting the coasts in search of dead seals and whales, and the bodies of other birds. Professor Moseley aptly likens it to the vulture: "It soars all day along the coast on the look-out for food. No sooner is an animal killed than numbers appear as if by magic, and the birds are evidently well acquainted with the usual proceedings of sealers, who kill the sea-elephant, take off the skin and blubber, and leave the carcase. The birds gorge themselves with food, just like the vultures, and are then unable to fly. I came across half a dozen at Christmas Harbour in this condition. We landed just opposite them; they began to run to get out of the way. The men chased them; they ran off, spreading their wings, but unable to rise. Some struggled

By permission of the Hon. Walter Rothschild] [*Tring*

CARTING ALBATROSS EGGS ON THE ISLAND OF LAYSAN

At one time these birds were protected; as this photograph testifies, this is no longer the case

into the water and swam away, but two went running on, gradually disgorging their food, in the utmost hurry, until they were able to rise, when they made off to sea."

The FULMAR PETREL is a British bird. On St. Kilda, Professor Newton tells us, from 18,000 to 20,000 young are killed in one week in August, the only time when, by the custom of the community, they are allowed to be taken. These, after the oil is extracted, serve the islanders for winter food.

The STORM-PETREL is a small bird which breeds abundantly in St. Kilda and the Orkneys, and so fearless that it will allow itself to be taken from the nest by hand. Immediately this is done, the bird vomits a quantity of pure oil from its mouth. The wild fowlers make use of this habit, capturing the bird, collecting the oil, and setting the prisoner free again. A story is related of a storm-petrel which was kept in a cage for three weeks. It was fed by smearing its breast with oil, which the bird swallowed by drawing the feathers separately through its beak. These birds are popularly supposed to be seen only before stormy weather, and therefore are not welcomed by sailors, who call them "Devil's Birds" and "Witches." This bird seems to commend itself to some palates; thus the late Mr. Seebohm says: "Cooked on toast, like snipe, we found them delicious eating, very rich, but not at all fishy."

We cannot refrain from a brief mention of the remarkable little DIVING-PETREL — remarkable because of its unlikeness to all the other Petrels and its strong resemblance to the Auks. But its tubular nostrils and certain anatomical characters proclaim its true affinities. "This is a petrel," says Professor Moseley, "that has given up the active aerial habits of its allies, and has taken to diving, and has become specially modified by natural selection to suit it for this changed habit, though still a petrel in essential structure." On two occasions Professor Moseley met with them in the Strait of Magellan, and describes the water as being covered with these birds in flocks extending over acres, which were made black with them.

CHAPTER VII

STORKS, HERONS, AND PELICAN TRIBE

THE Storks, Herons, and Pelican Tribe form a group of closely allied but externally very unlike birds, distantly related to the Petrels on the one hand, and the Cranes and Hawk Tribe on the other.

THE STORKS

There are few birds which have figured more prominently in the realms of fairy tale and fable than the WHITE STORK. To-day it is almost universally held in affectionate regard, and in Holland, Denmark, and Germany is afforded the strictest protection, every effort being made, in localities where it is plentiful, to induce it to build its nest upon the house-roof. Sometimes, to effect this, its fondness for a stage of some sort being known, a cart-wheel is set up, and this generally proves successful, the grateful bird erecting thereon its nest. Once occupied, it may be held by several generations of tenants; and year by year additions are made to the nest, so that the original shallow structure at last attains a height of several feet. The material used in its

Photo by L. Medland, F.Z.S.

FULMAR PETREL

Like the vulture, this bird will so gorge itself with food as to be unable, for a time, to fly

construction consists of sticks and other substances. He considers himself a fortunate man indeed who can boast a stork's nest on his house.

To show how widespread is the regard in which this bird is held, we may mention that in Morocco, according to Colonel Irby, "almost every Moorish hovel has its stork's nest on the top, a pile of sticks lined with grass and palmetto-fibre," and he goes on to relate that in "Morocco and Fez, and some other large towns in the Moorish Empire, there is a regular storks' hospital, and that, should one be in any way injured or fall from the nest, it is sent to this institution, or rather enclosure, which is kept up by subscriptions from wealthy Moors, who regard the stork as a sacred bird."

Though the nest appears to be generally placed upon buildings, it is, when these fail, built in trees, and the selection of such sites must be regarded as representing the original practice of the species.

The stork is one of the very few birds which appear to be quite dumb. It supplies the want of a voice by a very remarkable clapping noise made by the long, horny beak. But even this noise is rarely made, and appears to be prompted by unusual excitement. "During the breeding-season," Mr. Howard Saunders tells us, "storks keep up a clappering with their bills, and this sound may frequently be heard proceeding from a number of birds circling in the air at such a height as to be almost invisible."

The affection displayed by storks for their young is proverbial. They feed them by thrusting their beaks down into the gaping little mouths, and injecting the half-digested remains of their last meal, which may represent reptile, frog, or fish, varied by a small mammal, young bird, worms, or insects.

The white stork is a really beautiful bird. Except the quill- and some of the smaller wing-feathers, which are black, the plumage is snow-white, whilst the bill and the legs are bright red. Like the swallow, it performs extensive migrations, traveling in flocks, numbering many thousands, at an immense height.

By permission of the Hon. Walter Rothschild, Tring

WHALE-HEADED STORK

A rare species, remarkable for the huge size of the beak

Scarcely less beautiful is the BLACK STORK, and, like its white-plumaged ally, it is also an occasional visitant to Britain. It is a handsome bird, having the plumage of the upper-parts black, richly glossed with purple, copper, and green; the under-parts pure white; and the legs and beak red. But it is far less sociable, and consequently less known, than the white stork, shunning the haunts of men, and seeking seclusion for its nest in the lofty trees of large forests.

The largest members of the Stork Tribe are the ADJUTANT-STORKS and JABIRUS. The adjutants are also, to our eyes at least, singularly ugly birds. In spite of this very natural disadvantage, they have won a very high place in the regard of the people among whom they dwell, on account of the fact that, both in Africa and India, they perform, with the vultures, the work of scavengers. Yet there is something of quaintness about these birds, if they are watched from a distance too great to reveal the character which imparts the ugliness to which we have referred, and their actions not seldom border on the grotesque. The name Adjutant has been bestowed upon them on

Photo by Ottomar Anschütz] [*Berlin*

WHITE STORKS

The right-hand figure shows the bird making the curious clappering with its beak

Photo by Ottomar Anschütz] [*Berlin*

WHITE STORK

A parent bird returning with a frog for its young

Photo by W. P. Dando, F.Z.S.

ADJUTANT-STORK

The curious wind bag is well shown

account of the peculiar gait, which bears a fanciful resemblance to the measured pacing of an officer on parade. Like all the Storks, they have large bodies and very long legs, but they have outstripped all their relatives in the enormous size of the beak. The features which have earned this unenviable reputation for ugliness are the peculiarly unkempt and unwashed appearance of the head and neck. These are but scantily clothed in very shabby, brown-looking down-feathers; and the neck is made still more, we might almost say, repulsive by the presence of a large bare pouch, which can be distended with air to an enormous size at will. The Arabs, on account of this pouch, call the species resident with them "The Father of the Leather Bottle." Some, however, say that the correct translation of the native name would be "The Father of the Beak." But it is not only on account of their scavenging propensities that the adjutants are esteemed, for it is from the under tail-coverts of these birds that the much-prized "marabou" or "comercolly" feathers are obtained — at least the finest kinds; for some appear to be furnished by that chief of scavengers, the vulture. More precious still "is the celebrated stone called Zahir mora, or poison-killer, of great virtue and repute as an antidote to all kinds of poison," to be procured only by splitting open the head of the bird before death. Needless to say, the existence of this stone lives only in popular superstition, though how many poor birds have fallen victims thereto is not pleasant to contemplate.

Photo by W. P. Dando, F.Z.S.

ADJUTANT-STORK

This shows the bird in a rather unusual attitude

Photo by Scholastic Photo. Co.

JABIRU STORK

This bird stands between 4 and 5 feet high

Adjutants choose almost inaccessible pinnacles of rock on

which to build their nests, though they sometimes nest in trees. From two to four white eggs are laid, from which, if all goes well, as many young, covered with fluffy white down, are hatched.

The JABIRUS are distant relatives of, and scarcely inferior in size to, the Adjutants. There are three species, one occurring in the Indian Peninsula, New Guinea, and Australia, one in Africa, and one in South America. It is to this last species that the name Jabiru correctly applies. Furthermore, there can be no doubt that it is one of the handsomest of its tribe. The whole plumage is pure white, and the upper-parts are made additionally resplendent by an indescribable satin-like gloss. The beautiful whiteness of its plumage is enhanced by the fact that the head and neck, bill and feet, are jet-black. Some would give the palm of beauty to the AFRICAN SADDLE-BILLED STORK. Black and white, as in the American form, are the contrasting "colours"; but the plumage of the body, instead of being pure white, is plentifully enriched with black, with beautiful purple reflections.

Photo by D. Le Souef [*Melbourne*

FLAMINGOES

In flight the long neck and legs are fully extended, giving the bird a very remarkable appearance

More or less nearly allied to the Storks are several species familiar enough to the professional ornithologist, but not very well known generally. One of the rarest and most interesting of these is the WHALE-HEADED or SHOE-BILLED STORK of the Nile, remarkable for its enormous boat-shaped bill. More common but equally interesting are the beautiful FLAMINGOES. Apart from the brilliancy of their colour, the most noticeable feature of these birds is the curious beak, which is bent downwards at a sharp angle, and provided on its inside with horny plates resembling those of the Ducks and Swans. The tongue of this bird, unlike that of the Stork Tribe generally, is thick and fleshy, and also resembles that of the duck.

The flamingo is the only member of the Stork Tribe which builds a mud-nest. Its foundation laid often in as much as 15 inches of water, and rising above the surface from 6 to 8 inches, with a diameter at the top of 15 inches, it forms a pile of no mean size. Strangely enough, though these birds are never so happy as when wading "knee" deep in water, yet after the construction of the nest the incubation of the eggs is delayed so long

Photo by Charles Knight

FLAMINGOES

On account of the swan-like neck and "strainers" along the edges of the beak, these birds have been regarded as long-legged members of the Duck Tribe, but they seem more nearly related to the Storks

that before they are hatched the water has disappeared, leaving a burning plain of sun-baked mud. On the top of this nest the parent sits with its long neck neatly curled away among the back-feathers, with its long legs doubled up, and projecting behind her for some distance beyond the tail. Until quite recently it was believed that the bird incubated its eggs by sitting *astride* the nest, the length of the legs forbidding any other position: this has now been proved beyond cavil to be an entirely erroneous opinion.

The eggs, two in number, are peculiar in that they are encased in a thick outer chalky coat, which on removal reveals a greenish-blue shell.

The characteristic crooked beak of the adult is not at all apparent in the young bird, and only appears as it approaches maturity.

The huge flocks in which these birds consort are graphically described by Mr. Abel Chapman as follows: "In herds of 300 to 400, several of which are often in sight at once, they stand feeding in the open water, all their heads under, greedily tearing up the grasses and water-plants from the bottom. On approaching them, which can only be done by extreme caution, their silence is first broken by the sentries, who commence walking away with low croaks; then hundreds of necks rise at once to full extent, every bird gaggling its loudest, as they walk obliquely away, looking back over their shoulders, as though to take stock of the extent of the danger. Pushing a few yards forward, up they all rise, and a more beautiful sight cannot be imagined than the simultaneous spreading of the crimson wings, flashing against the sky like a gleam of rosy light. In many respects these birds bear a strong resemblance to geese. Like them, flamingoes feed by day; and great quantities

Photo by W. P. Dando, F.Z.S.

EUROPEAN FLAMINGOES

These birds breed in the South of France and Spain

ROSEATE SPOONBILL.
(Ajaja ajaja).
⅓ Life-size.

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of grass, etc., are always floating about the muddy water when a herd has been feeding. Their cry is almost indistinguishable from the gaggling of geese, and they fly in the same catenarian formations."

The SPOONBILLS and IBISES also belong to the Stork Tribe. The former are remarkable chiefly for the strange spoon-shaped bill: one species, a few hundred years ago, nested in England. This remarkable beak is associated with a peculiar method of feeding, well described by the late Mr. Wolley. During the operation, he says, "the beak was passed sideways through the water, and kept open till something palatable came within its grasp; but the action by which the bird effected this was most singular; for instead of turning only its head and neck, it turned its whole body from left to right and from right to left, like the balance-wheel of a watch; its neck stretched out and its beak immersed perpendicularly to about half its depth: this semicircular action was kept up with great vigour and at a tolerably quick march."

Photo by W. P. Dando, F.Z.S.

SPOONBILL

So called on account of its spoon-shaped bill

Photo by W. P. Dando, F.Z.S.

SACRED IBIS

Sacred to the ancient Egyptians, it is known to the Abyssinians to-day as "Father John"

A graphic description by Mr. Alfred Crowley of a visit to the breeding haunts of the spoonbill, about fifteen miles from Amsterdam, in 1884, is well worth reproducing here: "Taking a small boat in tow, we were punted across the open water, over which were flying numbers of sand-martins, swifts, common and black terns, and black-headed gulls, the reeds being full of coots, moorhens, sedge- and reed-warblers, etc., and in the distance we saw, rising above the reeds occasionally, a small spoonbill or purple heron. On nearing a large mass of reeds, one of the boatmen struck the side of the punt with the pole, when up rose some fifty spoonbills and eight or ten purple herons; and as we came closer to the reeds there were soon hovering over our heads, within easy shot, some 200 of the former, and fifty or sixty of the latter. Strange to say, not a note or sound escaped from the spoonbills, and only a few croaks from the herons. On reaching the reeds, we moored our punt, and two of the men, wading in the mud, took us in the small boat about fifty yards through the reeds, where we found ourselves surrounded by spoonbills' nests. They were placed on the mud among the reeds, built about 1 foot or 18 inches high and 2 feet in diameter at the bottom, tapering to 1 foot at the top, where there was a slight depression, in which lay four eggs, or in most cases four young birds, many ready to leave the nest, and several ran off as we

Photo by J. T. Newman

YOUNG HERONS FOURTEEN DAYS OLD IN NEST

Photographed in the top of a pine-tree 60 feet from the ground

approached. In the nests with young there was a great difference in age and size, one being about a day or so old, and the oldest nearly ready to leave the nest—some two or three weeks old—so that evidently the birds lay their four eggs at considerable intervals, and begin to sit on depositing the first. After wandering about, a matter of difficulty on account of the mud, we found a clutch of only three eggs, and one of four, which I managed to blow. We also obtained two clutches of eggs of the purple heron, but some of the latter had young."

The IBISES, though much alike in form, are strangely diverse in colour. One species was sacred to the Ancient Egyptians. The reverence and affection they showed to this bird, above all others, is probably largely due to its migrating habits, which obtained in that far past just as they do to-day. The naturalist Brehm says on this subject: "When the Nile, after being at its lowest ebb, rose again, and the water assumed a red tinge, then the ibis appeared in the land of the Pharaohs as a sure guarantee that the stream — the giver and preserver of life, which the people in their profound reverence raised to the rank of a god—would once again empty the well-spring of plenty over the thirsty land. The servant and messenger of an all-bounteous Deity commanded of a necessity a reverence of a poetic and distinguished character, by reason of its importance: he too must be a god."

Another species, the GLOSSY IBIS, occurs sometimes in Britain. Perhaps the most beautiful of all is the SCARLET IBIS of America, numbers of which can be seen in the Zoological Gardens of London. On account of the curved, sickle-shaped bill the Ibises were at one time believed to be related to the Curlews: this, however, is now known to be quite incorrect.

It was at one time believed that "the ibis [was] adopted as a part of the arms of the town of Liverpool. This bird is termed a *Liver*, from which that flourishing town derived its name, and is now standing on the spot where the *Pool* was, on the verge of which the *Liver* was killed." The arms of the town of Liverpool, however, as Mr. Howard Saunders points out, are "comparatively modern, and seem to have no reference to the ibis. The bird which was adopted in the arms of the [extinct] Earls of Liverpool was described in a former edition of 'Burke's Peerage' as a cormorant, holding in the beak a branch of seaweed. In the Plantagenet seal of Liverpool, which is believed to be of the time of King John, the bird has the appearance of a dove, bearing in its bill a sprig of olive, apparently intended to refer to the advantages that commerce would derive from peace."

The glossy ibis has been found breeding in colonies of thousands in Slavonia. The nests are large structures formed of sticks and a few weeds, never far from the water, and many even, in the colony referred to, were so near the surface that they appeared to be floating. The eggs, three or four in number, are of a beautiful greenish blue. The young, while still unable to fly, climb actively among the branches of the trees in which the nest is placed, clinging so firmly with the feet as to be removed with difficulty.

SCARLET IBIS.
⅓ Life-size.

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By permission of Professor Bumpus] [*New York*

GREAT BLUE HERON

This bird ranges from the Arctic regions to the West Indies and South America

Photo by W. P. Dando, F.Z.S.

COMMON NIGHT-HERON

law, being held in high regard both as an object of sport and a desirable addition to the dinner-table. So late as James I.'s time an Act was passed making it illegal to shoot with any gun within 600 paces of a heronry. The favourite way of taking the heron was by hawking, a sport which has furnished material in abundance both for poet and painter.

Herons breed in more or less extensive colonies, the nests — somewhat bulky structures, made of sticks and lined with twigs—being placed in the tops of high trees. From four to six is the normal number of eggs, and these are of a beautiful sea-green colour. The young are thinly clad in long, hairy-looking down, and for some considerable time are quite helpless.

Similar in appearance to the common heron is the American GREAT BLUE HERON, though it is by no means the largest of the herons, as its name might seem to imply. This distinction belongs to the GOLIATH HERON. A native of Africa, it is remarkable not only for its size, but for an extraordinary development of long, loose feathers hanging down from the lower part of the breast, and bearing a strange resemblance to an apron, concealing the upper part of the legs.

Passing over many species, we pause to descant on the EGRETS. These are numbered

THE HERONS AND BITTERNS

In the first mentioned of these two groups the COMMON HERON is the best known in the British Islands. Indeed, there must be few who have not encountered it in a wild state at some time or another. In suitable spots it may occasionally be met with standing mid-leg in water on the look-out for eels and other fish and frogs, a diet varied by an occasional young bird or small mammal. Sometimes this prey is hunted, so to speak, the bird walking along with a slow, measured step, striking with lightning rapidity and wonderful precision the moment its victim is sighted, whilst at others it stands motionless, as when fishing, striking the instant the unsuspecting eel or flounder comes within range.

From the earliest times until the reign of William IV. the heron was specially protected by

Photo by Scholastic Photo. Co.

YOUNG COMMON HERONS

These birds have not yet acquired their full plumage

amongst the most unfortunate of birds, and this because of the gracefulness and beauty of certain parts of the plumage worn during the breeding-season, which are coveted alike by Eastern magnates and Western women. The feathers in question are those known as "egrets," or, more commonly, "ospreys"; and their collection, as Professor Newton points out, causes some of "the most abominable cruelty practised in the animal world." The wearing of these feathers can no longer be excused; for Sir William Flower in England, and Professor W. E. D. Scott in America, have given the greatest publicity to the horrible barbarities and sickening scenes which are perpetrated by the men sent to gather in this harvest. The egrets, however, are not the only victims, as a glance at the milliners' windows will show, the distorted and mangled bodies of almost every known species of the smaller

Photo by Dr. R. W. Shufeldt] [*Washington*

GREEN HERON

This is a North American bird of skulking and nocturnal habits

birds being therein displayed! Many of those who wear these "ornaments" offend unwittingly; it is certain that if they realised the suffering and waste of life that this method of decoration entails they would eschew any but ostrich feathers for ever.

The CATTLE-EGRET, better known as the BUFF-BACKED HERON, breeds in the southern portion of the Spanish Peninsula, where from March to autumn it is very common in the marshes of Andalusia, thousands congregating there, herding with the cattle, from the backs of which they may be often seen picking off the ticks; hence the Spaniards give them a name meaning "cattle-cleaners."

The NIGHT-HERONS are comparatively small birds, and derive their name from their habit of turning night into day, waking up only as the shades of evening fall to hunt for food; only during the breeding-season is this habit broken through, when they are obliged to hunt

for food for their young during the daytime. They breed in colonies, in bushes or low trees in the neighbourhood of swamps. In some places they are protected — as, for instance, round the Great Honam Temple at Canton, where these birds are held sacred.

Colonel Swinhoe, says Mr. Howard Saunders, describes the nests "as placed thickly in some venerable banyans, the granite slabs that form the pavement beneath the trees being bedaubed with the droppings of old and young, while from the nests arose the chattering cry of the callow broods, for which the parent birds were catering the whole day long, becoming more active at sunset. As darkness set in, the noise and hubbub from the trees rose to a fearful pitch."

In Hungary large numbers of herons and egrets breed together in the marshes, egrets and night-herons breeding together with the common and purple herons. Landbeck, an enthusiastic ornithologist, writes of such heronries: "The clamour in these breeding-places is so tremendous and singular in its character as almost to defy description; it must be heard before a person can form any idea of what it is like. At a distance these hideous noises blend with a confused roar, so as in some way to resemble the hubbub caused by a party of drunken Hungarian peasants; and it is only on a nearer approach the separate notes of the two species, the common and the night-heron, can be distinguished — namely, 'craik' and 'quâck,' to which the notes of the young, 'zek-zek-zek,' . . . in different keys, serve as an accompaniment. When close to, the noise is tremendous and the stench unbearable. This, together with the sight of dozens of young herons in every stage of putrefaction and teeming with maggots, is perfectly sickening, though the contemplation of life and movement in this immense heronry is a matter of interest to the true ornithologist. . . . The tops of the highest trees are usually occupied by the nests of the common heron; a little lower down is the habitation of the shy and beautiful GREAT EGRET, while in the forks of the lowest branches the night-heron takes up her abode. All these species build in one and the same tree, the nests numbering not infrequently as many as fifteen in a single tree, and yet peace invariably reigns amongst all these varieties. High over the trees appears the common heron, laden with booty, announcing his arrival with a hoarse 'craaich,' when, changing his note to a goose-like 'da-da-da-da,' he either jerks the provender down the throats of the ever-hungry youngsters or throws it up before them, when the fish are greedily swallowed, amid a desperate accompaniment of 'gohé-é-é-é, gohé-é-é-é,' a sound much resembling the frantic cry of a calf which is being lifted into a farmer's market-cart. The conduct of the more cautious egret is very different. Circling far above the nest, she first satisfies herself that no foe is hidden below before she alights among her family, which are much quieter and less hasty than their cousins. The night-herons, on the contrary, approach their nests from all sides, high and low, their crops filled with frogs, fish, and insects. A deep 'quâk' or 'gowek' announces the arrival of the old bird already from some distance, to which the young answer, while feeding, with a note resembling 'queht, queht,' or 'quehaoâheh, quehoehah.' As soon as the parents have taken their departure the youngsters recommence their concert, and from every nest uninterrupted cries of 'tzik, tzik, tzik, tzek-tzek, tzek,' and 'gétt, gétt-gett,' are

Photo by W. P. Dando, F.Z.S.

BUFF-BACKED HERON

This bird habitually picks insects from the backs of cattle

the order of the day. This amusement is varied by the nestlings climbing out among the branches till they reach the top of the tree, whence they can have a good look out, and can see the old birds returning home from a long distance, though they are in many cases often mistaken in their identity."

A common North American bird is the so-called GREEN HERON, known by many local aliases, such as "Fly-up-the-Creek," "Chalk-line," and "Chuckle-head." Seen at short range, its plumage is lustrous and beautiful, but this disappears as soon as the bird takes wing. The nest is of very loose construction; and a story is told of one which was such a shaky concern that every time the old birds jarred it a stick fell off, and the structure grew smaller and smaller, until the day when the young were ready to fly there were but three sticks left; finally these parted, and the little herons found themselves perching on the branch that once held the nest!

Photo by Scholastic Photo. Co.

INDIAN CATTLE-EGRET

This is a species of buff-backed heron, and earns its name from its habit of hovering round cattle for the sake of picking off the ticks by which they are infested

THE BITTERNS

These are birds of a remarkable type of coloration, adapted to aid their skulking habits. The coloration partakes so completely of the nature of the undergrowth among which they dwell, that, aided by certain peculiar habits described below, they succeed in harmonising so perfectly with their surroundings as to render themselves invisible to their enemies.

The best-known species in Britain is the COMMON BITTERN, though this epithet no longer applicable, for at the present time it is but an occasional visitant there. Once it was plentiful enough, as the frequent references both in prose and poetry bear witness. These references have been inspired mainly by its very peculiar note, made apparently only during the breeding-season. This sound is variously described as "booming," "bellowing," and "bumping," and many are the theories which have been invented to account for its origin. Thomson, in "The Seasons," says that it is made whilst the beak is thrust into the mud: —

> The bittern knows his time, with bill ingulf'd
> To shake the sounding marsh.

Chaucer, that it is caused whilst it is immersed under water; and Dryden represents it as

made by thrusting the bill into a reed. Mr. J. E. Harting is one of the few who have actually watched the bird during the production of the sound, and from him we gather that it is made by expelling the air from the throat whilst the head is held vertically upwards.

The protective coloration and the peculiar habits associated therewith have only recently been recognised. These birds, when threatened, do not take flight, but immediately bring the body and the long neck and pointed head into one vertical line, and remain absolutely motionless so long as the cause of alarm persists. The peculiar coloration of the body harmonises so perfectly with the surrounding undergrowth, that, as just remarked, detection is well-nigh impossible. Although the pattern and tone of the coloration vary in the various species of bittern — which occur all over the world — this principle of protection obtains in all.

The drainage of the fens is answerable for the extinction of the bittern in England.

We would draw special attention to the great length of the feathers on the neck, which, when the bird is excited, are extended on either side to form an enormous feather shield. This is admirably shown in the photograph below, which represents a bittern preparing to strike. It is a curious fact that, when extended, the hind part of the neck is protected only by a thin coat of down. When the excitement has passed, the elongated feathers fall again, and, curling round the unprotected area, give the bird the appearance of having a perfectly normally clothed neck.

A wounded bittern will strike at either man or dog, and is extremely dangerous, owing to the sharpness of its dagger-like bill. If a dog advances on one not entirely disabled, the bird immediately turns itself upon its back, and fights with beak and claws, after the fashion of a wounded hawk or owl. Owing to the way in which the neck can be tucked up, by throwing it into a series of curves, and then suddenly extended, great danger attends the approach of the unwary.

The bittern is by no means particular in its choice of food, small mammals, birds, lizards, frogs, fishes, and beetles being alike palatable. The writer remembers taking from the gullet and stomach of one of these birds no less than four water-voles, three of which had apparently been killed only just before it was shot, for the process of digestion had hardly begun.

On migration these birds appear to travel in flocks of considerable size, since Captain Kelham reports having seen as many as fifty together high up in the air, when between Alexandria and Cairo. Curiously enough, they flew like "a gaggle" of geese — in the form of a **V**; but every now and then he noticed they, for some reason or other, got into great confusion.

At one time the flesh of the bittern was much esteemed as food for the table, being likened in taste and colour to the leveret, with some of the flavour of wild-fowl. Sir Thomas Browne, who flourished during the middle of the seventeenth century, says that young bitterns were considered better eating than young herons.

Photo by F. L. Bonhote, Esq.

COMMON BITTERN

Preparing to attack (side view)

In the fourteenth century it bred in considerable numbers in the fens of Cambridgeshire, and was so highly esteemed as a bird for the table that the taking of its eggs was forbidden. At a court-baron of the Bishop of Ely, according to Mr. J. E. Harting, held at Littleport in the eleventh year of the reign of Edward II., several people were fined for taking the eggs of the bittern and carrying them out of the fen, to the great destruction of the birds. Decreasing steadily in numbers, the bittern continued to breed in Britain till the middle of the nineteenth century, one of the last nests being taken in Norfolk in 1868.

Photo by W. P. Dando, F.Z.S.] [*Regent's Park*

EGYPTIAN PELICAN

In the Pelicans the two sexes are coloured alike

Photo by the Duchess of Bedford] *[Woburn Abbey*

CRESTED PELICAN

This bird derives its name from the curiously curled feathers on the top of the head and nape of the neck

The Pelican Tribe

The members of the Pelican Tribe may be readily distinguished from other living birds by the fact that all their toes are united in a common fold of skin or web. In the Ducks and other web-footed birds only the front toes are so united.

The Pelican Tribe embraces several apparently dissimilar forms, whose only claim to be grouped together, judged from a superficial point of view, lies in the fact that they possess the peculiar type of foot above mentioned. With the general appearance of the Pelican itself probably every one is familiar, but we had better mention here that the other representatives of the group with which we have now to deal are the Cormorants and Gannets, common on the British coasts, and the less-known Darters, Frigate-birds, and Tropic-birds; these, as we know from their anatomy, are all closely allied forms, and with the Pelicans make up a somewhat isolated group whose nearest allies appear to be the members of the Stork Tribe.

The PELICAN figures largely in ecclesiastical heraldry as the type of maternal tenderness. Tradition has it that the bird, in admonishing its young, occasionally did so with such violence as to slay them. Remorse immediately following, the distracted parent drew blood from its own breast, and therewith sprinkled the victims of its wrath, which thereupon became restored to life again. The exhaustion following on this loss of blood was so great that the young had perforce to leave the nest to procure food for themselves and the sinking parent. If any, through lack of filial affection, refused to aid in this good work, the mother, on recovering strength, drove them from her presence, but the faithful children she permitted to follow her wherever she went.

One of the most remarkable features of the pelican is the pouch which hangs suspended from the under side of the beak. This is capable of great distension, and is used, when fishing, as a sort of bag-net, of which the upper jaw serves as the lid. The young are fed by the female, which, pressing her well-filled pouch against her breast, opens her mouth and allows them to take their fill therefrom.

Pelicans display great sagacity when fishing, a flock often combining to form a horse-shoe, and, driving the fish into a mass, take their fill. This method, of course, is only possible when fishing in the estuaries of rivers or lakes, where the fish can be "rounded up," so to speak. Clumsy as the pelican looks, it is yet capable of wonderful powers of flight; indeed, it shares the honour with the vultures, storks, and adjutants as an expert in the peculiar form of flight known as "soaring."

A North American species of pelican is remarkable in that during the breeding-season the beak is ornamented with a peculiar horny excrescence, which is shed as soon as that period is over.

Pelicans are natives of the tropical and temperate regions of the Old and New Worlds, and live in flocks often numbering many thousands. The nest is placed on the ground, and therein are deposited two white eggs. The young are helpless for some time after hatching.

Photo by D. Le Souf [*Melbourne*

YOUNG AUSTRALIAN PELICAN

Pelicans, like gannets and cormorants, are hatched perfectly naked and quite blind

In all some six-and-thirty species of CORMORANTS are known to science, of which two are commonly to be met with round the British coasts, one of which also travels inland to establish itself on such lakes and rivers as may afford it support.

In various parts of the world cormorants are taken when young and trained to catch fish: sometimes for sport, or—as in China—to furnish a livelihood for their owners. At one time the Master of the Cormorants was one of the officers in the Royal Household of England, the post having been created in 1611 by James I. The method of hunting is as follows:—After fastening a ring around the neck, the bird is cast off into the water, and, diving immediately, makes its way beneath the surface with incredible speed, and, seizing one fish after another, rises in a short space of time with its mouth full and throat distended by the fish, which it has been unable to swallow by reason of the restraining ring. With these captures it dutifully returns to its keeper, who deftly removes the fish, and either returns the bird to the water, or, giving it a share of the spoil, restores it to its perch.

Cormorants nest either in trees or on the ground; they lay from four to six eggs, and the young feed themselves by thrusting their heads far down the parents' throats and helping themselves to the half-digested fish which they find there.

The cormorant has a certain sinister appearance equalled by no other bird, so that its introduction in Milton's "Paradise Lost" (Book IV., 194) seems particularly appropriate. Satan, it will be remembered, is likened to a cormorant:—

> So clomb this first grand Thief into God's fold:
>
> . . . . . .
>
> Thence up he flew, and in the Tree of Life,
> The middle tree and highest there that grew,
> Sat like a cormorant.

The curious bottle-green plumage, green eyes, long hooked beak, and head surmounted by a crest of the smaller sea-loving representative of the two British species were doubtless familiar enough to Milton before blindness overtook him.

Some of our readers may have made the acquaintance of the cormorant's nearest ally, the DARTER, or SNAKE-NECK, in the Fish-house at the

Photo by W. Saville-Kent, F. Z. S.

YOUNG PELICANS

Young pelicans never develop long down-feathers, like gannets and frigate-birds

Zoological Gardens of London. For the sake of those who have not, we may say that the darter may be described as a long-necked cormorant, with somewhat lighter plumage. The head is small and flat, and armed with a pointed, dagger-like bill, whose edges are finely toothed, with needle-like points projecting backwards. The neck is very long and slender; hence its name of Snake-neck. Furthermore, it is remarkable for a very strange "kink," formed by a peculiar arrangement of the neck-bones—an arrangement intimately associated with its peculiar method of capturing its prey, which, as with the cormorant, is pursued under water. How dexterously this is done may be seen any day in the Fish-house at the Zoological Gardens, where, as we have already mentioned, these birds are kept. At feeding-time they are turned loose into a large tank into which a number of small fish have been placed. The birds dive as soon as they reach the water, and with surprising speed chase their prey till within short range. Then, by a sudden bayonet-like lunge, made possible by the peculiar "kink" in the neck, a victim is transfixed, brought to the surface, released from the bill by a series of sudden jerks, tossed into the air, and dexterously caught and swallowed.

Photo by Scholastic Photo. Co.

CORMORANT

In the spring a slight crest is developed, and a white patch appears on the thigh

The darter is found in Africa, India, the Malay region, Australia, and South America, frequenting the banks of rivers, lakes, and swamps, sometimes singly, sometimes in pairs or in immense flocks.

Very different from either of the foregoing species, both in build and coloration, is the GANNET. In its habits it is also different. The adult bird is about the size of a goose, white in colour, and armed with a powerful pointed bill. The young have a quite distinct plumage, being deep brown, speckled with white, this livery being worn for nearly three years.

The greater part of a gannet's lifetime seems to be spent upon the wing, a fact which implies a very different method of feeding from that followed by the cormorant and darter; and this is actually the case. Preying upon shoals of herring, mackerel, sprats, or pilchards, the birds, flying singly or in flocks, as soon as the fish are discovered, rise, soar in circles to such a height as experience shows best calculated to carry them by a downward motion to the required depth, and then, partially closing the wings, plunge upon their prey, and rarely without success, the time which elapses between the plunge and the immersion being about fifteen seconds. A flock of gannets feeding is a really wonderful sight, and can be witnessed in many places around the British coasts, for the gannet is one of the very common British birds. The pilchard-fishermen off the Cornish coast learn when the shoals are at hand, and the direction in which they are travelling, by the actions of these birds. A very cruel experiment is sometimes practised upon the gannet, based upon its well-known method of fishing. A herring is tied to a beam and set adrift, and the bird, not noticing the trap, plunges with its usual velocity upon the

DOUBLE-CRESTED CORMORANT.
(Phalacrocorax dilophus).
⅛ Life-size

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By permission of the Hon. Walter Rothschild] [*Tring*

FRIGATE-BIRDS AT HOME

The feathers of frigate-birds are used for head-dresses in the Pacific Islands

Photo by Scholastic Photo. Co. [*Parson's Green*

YOUNG GANNETS, FIRST YEAR

The plumage at this stage is very dark brown, each feather being tipped with white

eightpence to a shilling each. . . . The fat is boiled down into oil, and the feathers, after being well baked, are used for stuffing beds, about a hundred birds producing a stone of feathers."

Gannets present one or two structural peculiarities of sufficient interest to mention here. In most birds, it will be remembered, the n[ostrils] open on each side of the beak; but in the gan[net] no trace of true nostrils remains; and the sa[me] may almost be said of the cormorant and darter.

Photo by Scholastic Photo. Co. [*Parson's Green*

GANNET, FULL PLUMAGE

The fully adult plumage is not attained till the bird is three years old

fish, with the result that it is killed instantly by the shock of the contact.

Gannets breed in colonies of thousands on the islands off the east and west coasts of Scotland. They lay but a single egg, in a nest composed of seaweed deposited in inaccessible crags of precipitous cliffs. The young are at first naked; later they become clothed with long white down. "At one time," says Mr. Howard Saunders, "young gannets were much esteemed as food, from 1,500 to 2,000 being taken in a season during the month of August. They are hooked up, killed, and flung into the sea, where a boat is waiting to pick up the bodies. These are plucked, cleaned, and half roasted, after which they are sold at from

Photo by Scholastic Photo. Co. [*Parson's Green*

GANNET, SECOND YEAR

The white plumage of the neck is just beginning to appear

In gannets, however, a slight indication of their sometime existence remains, though the nostril itself no longer serves as an air-passage; and these birds are compelled to breathe through the mouth. Again, the tongue, like the nostrils, has also been reduced to a mere vestige. Stranger still is the fact that immediately under the skin there lies an extensive system of air-cells of large size, which can be inflated or emptied at will. Many of these cells dip down between the muscles of the body, so that the whole organism is pervaded with air-cells, all of which are in connection with the lungs.

The FRIGATE- and TROPIC-BIRDS, which now remain to be described, are probably much less familiar to our readers than the foregoing species.

Photo by Valentine & Sons, Ltd. [*Dundee*

GANNETS ON THE BASS ROCK

The Bass Rock is the only breeding-station of the gannet on the eastern coast of the British Islands

FRIGATE-BIRDS are remarkable in more ways than one. To begin with, their general appearance may be described as that of a small, long-winged, fork-tailed albatross, mounted upon particularly diminutive legs, so short as to do little more than raise the body off the ground. Their flight is wonderfully graceful, and capable of being sustained for considerable periods; for, like the gannets, they pass most of their time on the wing. They feed upon surface-fish, which they capture from the surface of the water without alighting, or upon fish which they take from the gannets of the neighbourhood.

Frigate-birds build their nests in trees, on low bushes, or on the ground, and sometimes upon ledges of precipitous cliffs. The nest is a loose structure composed of sticks, and its construction is accompanied by much pilfering from one another. Only a single egg is laid.

About the beginning of January the male acquires a very remarkable pouch of brilliant scarlet skin, which hangs beneath the beak. Frigate-birds are found all over the world within the tropics.

The TROPIC-BIRDS, or BOATSWAIN-BIRDS, as they are sometimes called, are more like gulls or the heavier species of terns in general appearance, and in no way resemble superficially the forms with which they are associated, save in the fact that all the toes are enclosed in the same web. A study of their anatomy, however, leaves little doubt that these birds are really members of the Pelican Tribe.

Either pure white, relieved with black, or of a beautiful apricot-yellow, with similar black markings, with a powerful bill and long tapering tail, the tropic-bird is one of the most beautiful of sea-birds. There are altogether about six species of tropic-birds, distributed over the Pacific and Indian Oceans. They nest in hollows of cliffs or holes in trees, and lay a single egg, which bears some resemblance to that of a kestrel.

CHAPTER VIII

SCREAMERS, DUCKS, GEESE, AND SWANS

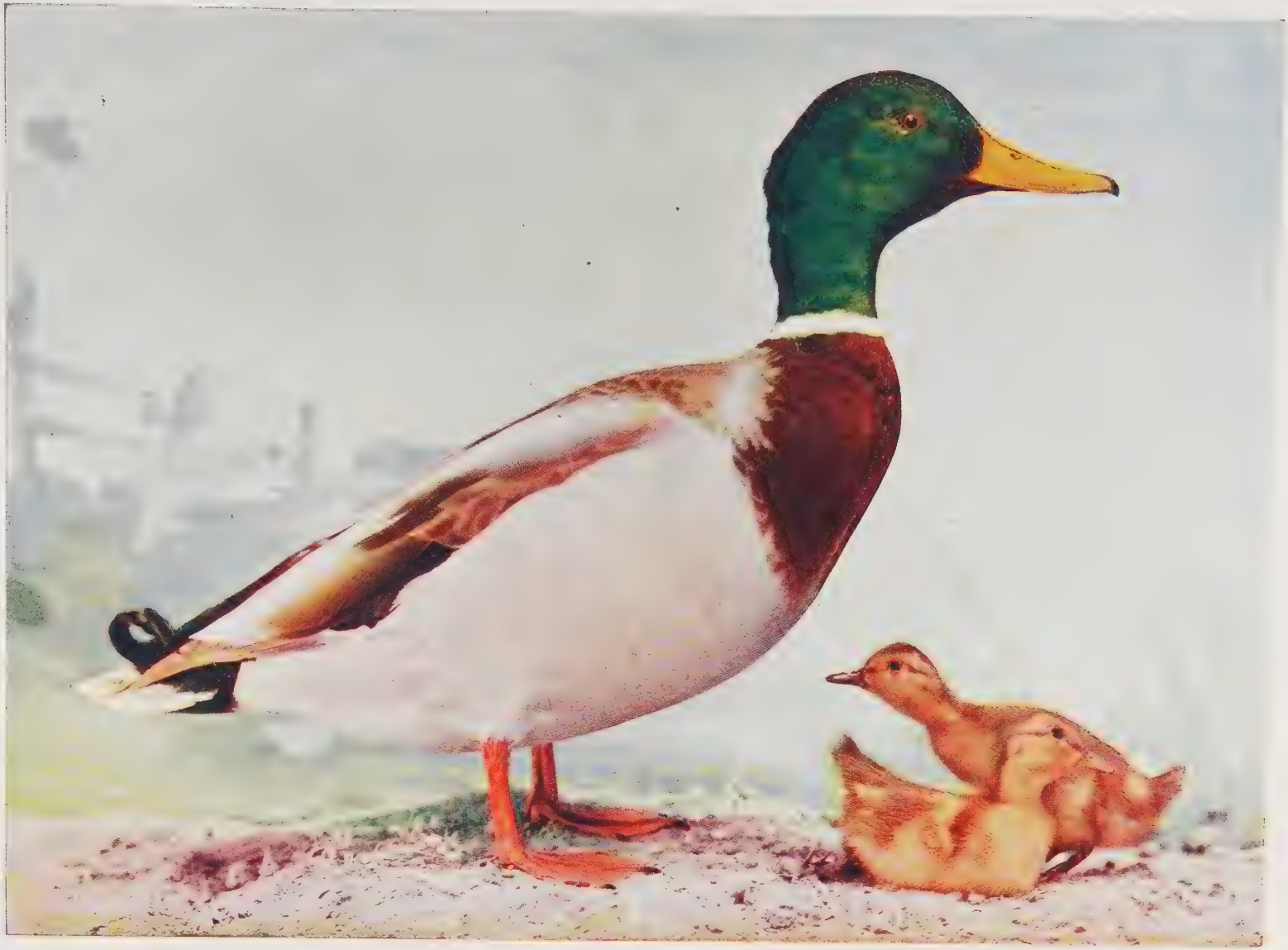
Photo by W. P. Dando, F.Z.S. [*Regent's Park*

CRESTED SCREAMER, OR CHAKA

The Crested and Horned Screamers are the only members of the family without webbed feet

FAMILIAR as are most of our readers with all save the first mentioned of these birds, yet few probably suspect how great a wealth of forms this group displays. All are more or less aquatic in their habits, of heavy build, with long necks and small heads, short legs, and short wings and tails. The young are hatched covered with a peculiar kind of down, which more nearly resembles that of the Ostrich Tribe than the down of other birds, and they run about or accompany their parents to the water either immediately or a few hours after hatching. Several species have become domesticated, and in some cases have given rise to peculiar breeds, whilst many are much in demand for the purpose of enlivening ornamental waters.

The least-known members of the group are the very remarkable and extremely interesting SCREAMERS of South America, of which there are three species. These are large birds, presenting some resemblances to the Game-birds on the one hand and the Geese on the



MALLARD DUCK.
1/2 Life-size.

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other. Not only the beak, but the skull, in certain characters, recalls that of the Game-birds. The body may be described as goose-like, but in the longer legs and enormous toes, which are not connected by a web, these birds recall the Megapodes, or Mound-builders (page 411).

The screamers are generally regarded as primitive members of the group with which they are now associated; but in many respects they are quite peculiar. Not the least interesting of their habits is the great predilection they observe for soaring in the air at immense altitudes, uttering the while the curious cry to which they owe their name. Several birds often do this at once. Yet stranger is the fact that they not seldom gather together in vast flocks to sing in concert. Mr. Hudson, for instance, states that the species known as the CRESTED SCREAMER on one occasion surprised him by "an awful and overpowering burst of 'melody,'" which saluted him from half a million of voices at an out-of-the-way spot in the pampas one evening at nine o'clock; and, again, once at noon he heard flock after flock take up their song round the entire circuit of a certain lake, each flock waiting its turn to sing, and only stopping when the duty had been performed.

Like the gannet, these birds are richly supplied with air-cells between the body and the skin, and between many of the muscles; so highly are these cells developed, that it is said a crackling sound is emitted when pressure is applied to the skin.

Photo by J. T. Newman] *[Berkhamsted*

AYLESBURY DUCK

This is one of the most esteemed of all domesticated breeds

Photo by J. W. McLellan] *[Highbury*

POCHARD

This is one of the diving-ducks

The wings of these birds are armed each with a pair of powerful and sharp spurs, recalling those of certain of the Plover Tribe (page 421), though in the latter only one spur is present on each wing.

The division of the remainder of this group into Ducks, Geese, and Swans is generally recognised, but no hard-and-fast line can yet be drawn between the several sections. We must regard them as representing adaptations to peculiar modes of life, which appear to be most marked in the duck-like forms. These may be divided into FRESH-WATER DUCKS, SALT-WATER DUCKS, SPINY-TAILED DUCKS, and MERGANSERS.

Of the FRESH-WATER DUCKS, the most familiar is the WILD-DUCK, or MALLARD. This is a resident British bird, and also the parent of the domesticated stock, which frequently closely resembles the wild form. In this species, as with the majority of the fresh-water ducks,

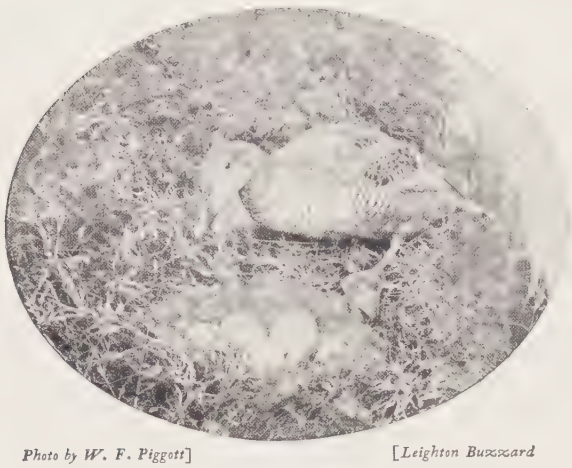

Photo by W. F. Piggott] *[Leighton Buxxard*

EIDER-DUCK

It is the down of this bird which is so much in demand for quilts

the males wear a distinctive livery; but the males for a few weeks during the summer assume more or less completely the livery of the female, a process aptly described as going into "eclipse." The assumption of the female dress at this season is necessary, since it harmonises completely with the surrounding foliage, and so effectually conceals the bird at a time when it is peculiarly helpless; for, as with all birds, the quills or flight-feathers are cast off by the process known as moulting once a year, but instead of being replaced in pairs, and the flight remaining unaffected, they are shed all at once, so that escape from enemies must be sought by concealment.

Usually among birds the male has the more powerful voice, but with the mallard and its allies the reverse is the case, the female giving forth the loud familiar "quack, quack," whilst the note of the male sounds like a feeble attempt to answer its mate, but smothered by a cold in the head. This peculiar and characteristic subdued voice is associated with a remarkable bulb-shaped bony enlargement at the bottom of the windpipe, just where it branches off to the right and left lungs, the female being without this swelling.

The nest is composed of grass, and lined with down plucked by the female from her own breast, with the sole object, it is generally believed, of keeping the eggs warm; but it is possible that the down is removed as much for the sake of bringing the warm surface of the body in closer contact with the eggs. The site chosen for the nest is exceedingly varied; usually the nest is placed on the ground and near the water, but sometimes in a hedgerow or in a wood, and occasionally in trees, and instances are on record where the deserted nests of hawks and crows have been appropriated. At such times the young seem to be brought to the ground by the parent, who carries them down in her bill. It is some time before the wings of the young birds are big enough to carry them; indeed, they are quite full grown in so far as the body is concerned. At this stage they are known as "flappers." Advantage was at one time taken of their helplessness in the "sport" known as "flapper-shooting." On other occasions numbers of people assembled and "beat" a vast tract of country, driving these young flappers before them to a given spot where nets were placed, in which as many as 150 dozen have been taken at one time. Fortunately this practice has been abolished by Act of Parliament.

Photo by W. F. Piggott] *[Leighton Buxxard*

SHELDRAKE

The female bird is just entering her nest at the bottom of a long burrow

Several very distinct

domesticated breeds of ducks have been derived from the mallard. The commonest breed differs but little, save in its great size, from the wild parent form, but the most esteemed are those known as the ROUEN and AYLESBURY. The PENGUIN-DUCK is the most aberrant and the ugliest of these breeds, having a peculiarly upright, awkward carriage, and very small wings.

The SALT-WATER DUCKS, or DIVING-DUCKS, are for the most part of a heavier build than the foregoing species, and many are of a sombre coloration. All the species are expert divers, and in consequence have the legs, which are short, placed far backwards, and this causes them to assume a more upright carriage when on land. The curious bony bulb at the base of the windpipe found in the fresh-water species becomes in the salt-water forms greatly enlarged, and its walls incompletely ossified, leaving large spaces to be filled by peculiarly delicate sheets of membrane. The majority of the species in this section frequent the open sea, but some occur inland.

One of the most useful, and at the same time most ornamental, of this section is the EIDER-DUCK, the male in full plumage being a truly magnificent bird: the female, as in the majority of ducks, is clad in sober colours. In Iceland and Norway the eider-duck is strictly protected, a fine being imposed for killing it during the breeding-season, or even for firing a gun near its haunts. This most unusual care is, however, by no means of a disinterested kind, but is extended solely that certain privileged persons may rob the birds of their eggs and the down on which they rest, the latter being the valuable eider-down so much in demand for bed-coverlets and other purposes. "The eggs and down," says Professor Newton, "are taken at intervals of a few days by the owners of the 'eider-fold,' and the birds are thus kept depositing both during the whole season. . . . Every duck is ultimately allowed to hatch an egg or two to keep up the stock." Mr. W. C. Sheppard gives an interesting account of a visit to an eider-colony on an island off the coast of Iceland. "On landing," he says, "the ducks and their nests were everywhere. Great brown ducks sat upon their nests in masses, and at every step started from under our feet. It was with difficulty we avoided treading on some of the nests. On the coast of the opposite shore was a wall built of large stones . . . about 3 feet high and of considerable thickness. At the bottom, on both sides of it, alternate stones had been left out, so as to form a series of square apartments for the ducks to nest in. Almost every apartment was occupied. . . . The house itself was a marvel. The earthen walls that surrounded it, and the window embrasures, were occupied by ducks. On the ground the house was fringed with ducks. On the turf slopes of its roof we could see ducks, and a duck sat on the door-scraper. The grassy banks had been cut into square patches, about 18 inches having been removed, and each hollow had been filled with ducks. A windmill was infested, and so were all the outhouses, mounds, rocks, and crevices. The ducks were everywhere. Many were so tame that we could stroke them on their nests, and the good lady told us that there was scarcely a duck on the island that would not allow her to take its eggs without flight or fear."

Photo by W. Reid] [*Wishaw, N.B.*

PARADISE-DUCKS

This species is a native of New Zealand, where the photograph was taken. The bird on the right with the white head is the female

The nest is composed externally of seaweed, and lined with down, which is plucked by the female from her breast as incubation proceeds, till eventually it completely conceals the eggs. Each nest yields about one-sixth of a pound, and is worth, on the spot, from twelve to fifteen shillings a pound.

The POCHARDS, SCAUPS, GOLDEN-EYES, and SCOTERS are relatives of the eider-duck; but since all resemble the latter in their general mode of life, we need not consider them here.

The MERGANSERS and SMEWS, to which reference has been made, differ markedly from all the ducks so far considered in the peculiar formation of the bill, which is relatively long and narrow, with its edges armed with sharp, tooth-like processes projecting backwards towards the back of the mouth. These processes are really only horny spines, and have no relation to

Photo by the Duchess of Bedford] [*Woburn Abbey*

CAPE BARREN GOOSE

This bird is a native of South-east Australia and Tasmania, and remarkable for its short beak

teeth, although they are used, as teeth would be, for holding slippery prey, such as fish, which form the greater part of the diet of these birds.

So far, in all the ducks which we have considered, the male differs conspicuously from the female in plumage; but in the forms we are now about to describe both sexes are coloured alike.

The first is the COMMON SHELDRAKE, which seems to lie somewhere on the borderland between the Ducks and the Geese. It is a very beautiful bird, conspicuously marked with broad bands of orange-chestnut, white, and black. The beak being coral red in colour, and further ornamented by a peculiar fleshy knob at its base, serves to set off the glossy bottle-green colour of the head and neck. As appears to be invariably the case where both sexes are coloured alike, the female builds her nest in a hole, generally a rabbit-burrow, whilst the young have a distinct livery, duller in tone than that of the parent. The female sheldrake breeds in Britain, and may be frequently seen at sea flying in small parties, which have been likened to a flock of butterflies.

The GEESE include birds of somewhat conspicuous coloration, besides a considerable number of more subdued aspect. The sexes are distinguished by different names, the female being known as the Goose, the male as the Gander, whilst the young is the Gosling. As we have already mentioned, there is no hard-and-fast line to be drawn between the three sections of this group. The Ducks are connected by the Sheldrakes with the Geese, through the Spur-winged Goose, the Egyptian and Orinoco Geese, and certain other species which cannot be alluded to on this occasion.

The SPUR-WINGED GEESE, of which there are two species, are African birds, and derive their name from the long spur seated on the wing.

Photo by W. Saville-Kent, F.Z.S. [*Milford-on-Sea*

AUSTRALIAN PYGMY GOOSE

The pygmy geese are expert divers

A still more remarkable form is the HALF-WEBBED GOOSE, so called from the fact that its feet are only partially webbed. It has a black-and-white plumage, a hooked beak, and a large warty prominence on the front of the head. It spends most of its time perched on the branches of the Australian tea-trees, and rarely enters the water. The windpipe is peculiar, being coiled in several folds between the skin and the breast-muscles.

From these peculiar forms we pass to the true geese. The largest living species is the CHINESE or GUINEA-GOOSE of Eastern Siberia, regarded as the stock from which the domesticated geese of Eastern countries have been derived.

European domesticated geese have been derived from the GREY or GREY-LAG GOOSE, a species at one time exceedingly common in England, breeding in considerable numbers in the fen districts, where the young were frequently taken and reared with the large flock of domesticated geese commonly kept at that time for the sake of their feathers. The grey-lag goose, however, has long ceased to breed in England, though a few still nest in Scotland. The most important breeds derived from the grey-lag are the TOULOUSE and EMDEN. Other British species are the BEAN-GOOSE, PINK-FOOTED and WHITE-FRONTED GEESE, and the "BLACK" BRENT and BARNACLE-GEESE, in all of which the sexes are precisely similar in coloration and subdued in tone.

Photo by W. P. Dando, F.Z.S. [*Regent's Park*

BLACK-NECKED SWAN

The fleshy knob at the base of the bill is of a bright red colour

In the New World some very beautiful white geese are found, which are still more interesting in that the females have a different coloration. These are the KELP- and UPLAND-GEESE of Patagonia and the Falklands. The female of the kelp-goose is brownish black above and black barred with white below, whilst the female of the upland-goose is rufous and black in colour. The latter may be seen in London parks.

Lastly, we have a few species known from their small size as PYGMY GEESE of Australia, India, and Africa. Perhaps the best known is the Indian species, called the COTTON-TEAL.

TRUMPETER- AND WHOOPER-SWANS

The trumpeter is the bird in the foreground: the whooper is remarkable for its musical note, resembling the word "whoop" quickly repeated

They are tiny birds, resembling small ducks rather than geese, and dive admirably, a feat which the larger species do not perform.

The SWANS are linked with the Geese through a very beautiful South American species, known as the COSCOROBA SWAN. It is the smallest of all the swans, pure white in colour, save the tips of the greater wing-quills, which are black, and the coral-red bill and feet.

Of all the swans, probably the best known is the MUTE SWAN, the semi-domesticated descendants of which are so common on ornamental waters. For hundreds of years the latter were jealously guarded, none but the larger freeholders being allowed to keep them, and then not without a licence from the Crown; with this licence was coupled an obligation to mark each swan with a particular mark, cut with a knife or other instrument through the skin of the beak, whereby ownership might be established.

It would seem that these swans and their descendants were not derived from the native wild stock, but were introduced into England, it is said, from Cyprus by Richard I. At the present day large "swanneries" have almost ceased to exist. Perhaps the largest is that of the Earl of Ilchester, at Abbotsbury, near Weymouth. In 1878 between 1,300 and 1,400 swans were to be seen there at one time, but latterly the number has been reduced to about half.

Although swans do not perhaps stand so high in the general esteem as table delicacies as with our forefathers, there are yet many who appreciate the flesh of this bird; but the St. Helen's Swan-pit at Norwich is the only place in England where they are systematically fattened for the table. Here from 70 to 200 cygnets—as the young swans are called—caught in the neighbouring rivers, are placed early in August, and fed upon cut grass and barley till Christmas, when they are fit for table, weighing, when "dressed," about 15 lbs.,

and fetching, if purchased alive at the pit, about two guineas each. The pit is constructed of brickwork, and is about 74 feet long, 32 feet wide, and 6 feet deep—the water, admitted from the river, being about 2 feet deep. The food is placed in floating troughs. The birds, "when so disposed," says Mr. Southwell, "leave the water by walking up a sloping stage, and thus obtain access to a railed-in enclosure, where they may rest and preen themselves."

The beautiful swan-like carriage, so familiar in the floating bird, seems to belong only to the mute swan, the other species of white swans carrying the neck more or less straight, and keeping the wings closely folded to the body.

No greater anomaly could at one time have been imagined than a BLACK SWAN. For centuries it was considered to be an impossibility. We owe the discovery of such a bird to the Dutch navigator Willem de Vlaming, who, more than 200 years ago, captured the first specimen at the mouth of what is now known, in consequence, as the Swan River. A year after their capture accounts reached England through the burgomaster of Amsterdam, and these were published by the Royal Society in 1698. The bird is now fairly common on ornamental waters, where its sooty-black plumage, set off by pure white quill-feathers and coral-red bill, contrasts strongly with the typical snow-white mute swan, generally kept with it.

Equally interesting is the handsome BLACK-NECKED SWAN of South America. In this species the plumage is pure white, save that of the neck, which is black. The distribution of this species is practically the same as that of the Coscoroba swan. Breeding freely in confinement, it has become a fairly common bird on ornamental waters. It shares with the mute swan the reputation of gracefulness when afloat, swimming with the neck curved and wings raised.

Photo by W. Reid] [*Wishaw, N.B.*

AUSTRALIAN BLACK SWANS AND CYGNETS

The cygnets are light-coloured, like those of the white swans

CHAPTER IX

BIRDS OF PREY AND OWLS

BIRDS OF PREY

AT one time the boundaries of this group were much larger than now, for within them were included at least one form which has since proved to belong to the Crane Tribe: we allude to the Seriema (page 428), and also to the Owls. This classification was based on the very remarkable superficial resemblance to the typical birds of prey which those forms bear. Modern ornithologists regard as birds of prey only the forms known as the New World Vultures, the Secretary-bird, and the Falcons, Eagles, Vultures, Buzzards, and the numerous smaller forms commonly classed as "Hawks."

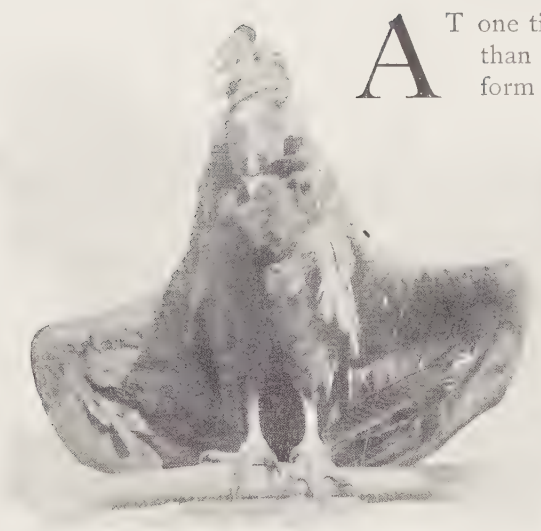

Photo by Scholastic Photo. Co. [*Parson's Green*

CONDOR

The habit of standing with the wings expanded is a very common one with these birds

THE NEW WORLD VULTURES

These may be distinguished from their distant relatives of the Old World by the fact that the nostrils are not divided from one another by a partition, and by their much weaker feet. The head and neck in all, as in the true vultures, is more or less bare, and, furthermore, is often very brilliantly coloured, in which last particular these birds differ from the typical vultures.

One of the most important members of the group is the CONDOR, one of the largest of flying birds, and when on the wing the most majestic. "When the condors," says Darwin, "are wheeling in a flock round and round any spot, their flight is beautiful. Except when rising off the ground, I do not recollect ever having seen one of these birds flap its wings. Near Lima I watched several for nearly half an hour, without once taking

Photo by W. P. Dando, F.Z.S.

CONDOR

The bare skin of the head and neck is of a dark purple colour, the ruff encircling the neck being of pure white down-feathers

off my eyes; they moved in large curves, sweeping in circles, descending and ascending, without giving a single flap." One which he shot measured, from tip to tip of the fully expanded wings, 8½ feet.

The condor, like its smaller relatives, hunts by sight, and not, as was at one time believed, by smell, feeding on the dead bodies of guanacos which have died a natural death or been killed by pumas, and upon other dead animals. In the neighbourhood where sheep and goats are kept, they are much dreaded, as they will attack the young kids and lambs. The flock-owners on this account wage constant war against them, capturing them by enclosing a carcase within a narrow space, and when the condors are gorged galloping up on horseback and killing them, for when this bird has not space to run it cannot rise from the ground. Sometimes the trees on which they roost are marked, and when night falls a man climbs the tree and captures them with a noose, for they are very heavy sleepers.

The condor ranges from the Andes of Ecuador, Peru, and Chili southwards to the Rio Negro on the east coast of Patagonia. It lays two large white eggs on a shelf of bare rock projecting from precipitous cliffs, and the young are said to be unable to fly till after they are a year old. As will be seen in the photographs, the head of the male is crowned by a bare, fleshy caruncle, which, like the surrounding bare skin, is of a dull reddish colour: lower down the neck is a frill of pure white down, which forms a conspicuous contrast with the glossy black plumage of the rest of the body and wings.

Photo by W. P. Dando, F.Z.S., Regent's Park

KING-VULTURE

The fleshy crest on the beak is developed in the females as well as in the males

The KING-VULTURE is a much smaller bird, but the bare parts of the head are much more brilliantly, even gaudily coloured, the combinations being orange, purple, and crimson. The plumage is creamy white and black. It is a comparatively rare bird, and but little is known concerning its breeding habits. The female is much more soberly clad than her mate. The king-vulture has a more northerly range than the condor, extending from Brazil to Mexico, Texas, and Florida.

Photo by W. P. Dando, F.Z.S. [*Regent's Park*

BLACK VULTURES

When disturbed, these birds eject foul-smelling matter

The commonest of the New World vultures is the TURKEY-BUZZARD, which is found over the whole of temperate and tropical America. Of the four species commonly known as Turkey-buzzards, three are exclusively South American — the fourth

Photo by Robert D. Carson, Esq. [*Philadelphia*

CALIFORNIAN VULTURE

The bare parts of the head are of a brick-red colour

ranges as far north as New York and British Columbia, and in the Southern and Middle United States is very common.

Other species are the small BLACK VULTURE, a dull, uninteresting-looking bird, and the CALIFORNIAN VULTURE. This latter is a large species, and in the expanse of wing may even exceed the condor. At one time its extermination seemed certain, owing to its falling a victim to the poisoned meat laid out by the stock-keepers for carnivorous mammals, but in the more barren and inaccessible regions it appears to be on the increase.

THE SECRETARY-BIRD

The second of the three main divisions into which the Birds of Prey are divided is reserved for the SECRETARY-BIRD. This bird derives its name from the crest of long feathers which bear a fanciful resemblance to the quill-pens a clerk is supposed to stick above his ear. It differs from all the other members of the Hawk Tribe in the exceedingly long legs, which in the young are said to be so fragile as to fracture if the bird is suddenly alarmed. It feeds chiefly on insects and reptiles, especially snakes, for which last it seems to have a special liking. It attacks even the most venomous species, striking at them with its powerful wings and pounding them with its feet, jumping upon them with great force, till rendered helpless, when they are at once swallowed head-foremost. On account of its great value as a snake-eater it has been accorded special protection, though unfortunately there is a tendency on the part of English settlers to relax this, on account of the fact that it will occasionally eat animals coming within the scope of "game." Valuable as the latter may be, there yet seems no justification for such a course.

The secretary-bird, which is a South African species, though extending northwards as far as Abyssinia, builds a huge nest of sticks in low bushes, under which will often be found numerous nests of the Cape sparrow, apparently the only available site on the veldt, where bushes are scarce. Here the sparrows are efficiently protected from the icy winds which so frequently sweep across this region, and apparently suffer no fear of personal violence from the fierce owners of the domicile above them. When sitting, the female secretary is fed by her mate. The young do not appear to leave the nest for five or six months. They are frequently taken from the nest and brought up as household pets, becoming not only very tame, but exceedingly useful.

THE EAGLE AND FALCON TRIBE

From the perplexing wealth of species displayed among the forms herein bracketed together, we can only select a few examples, which embrace, however, all the more important and interesting forms.

Beginning with the more lowly, we start with those members of small or medium size known as KITES, and as an example of the group take the species known in the British Islands as the KITE, or GLEAD. In former days this bird was extremely common in England,

CALIFORNIA VULTURE
$\frac{1}{3}$ Life-size.

COPYRIGHT 1900, BY A. W. MUMFORD, CHICAGO

being found in numbers not only in the rural districts, but in London itself, where, as old records of the fifteenth century show, it occurred in such numbers near London Bridge as to excite the wonder of foreigners visiting the city. These birds found an abundance of food in the garbage of the streets, and also of the Thames itself — "an observation," remarks Mr. Finn, "which throws a lurid light upon the city sanitation."

In the days of falconry the kite was royal game, not, however, by legal enactment, but by reason of the fact that none but specially trained falcons could secure a prey with such wonderful powers of flight. Consequently the price of a falcon which had attained this degree of skill was beyond the purse of any but a king.

Save on the wing, the kite is not a handsome bird, its general colour being of a pale reddish brown; but those who have had the good fortune to watch its flight are one and all impressed. Cowper admirably expresses the general admiration in the lines:—

Kites that swim sublime
In still repeated circles, screaming loud.

The kites may be distinguished from other members of the tribe by their forked tails. Somewhat of a scavenger, as we have already hinted, the kite feeds also upon such small game as moles, frogs, young birds, rabbits, snakes, and fish. Its partiality for young birds caused it to be much dreaded in the farmyard in the days when it was common; and when, with the introduction of modern and improved firearms, game-preserving became more strenuously prosecuted, its doom was sealed, for a ceaseless war was waged against it, which ended only with its extermination.

Nearly allied to the Kites, the HONEY-BUZZARDS next claim attention. The name Honey-buzzard is a misnomer, for honey forms no part of the bird's food. This species exhibits, however, a quite remarkable partiality for the immature stages of wasps and bees, the nests of which it tears in pieces with its feet, so as to lay bare the coveted morsels, devouring them on the spot, perfectly regardless of the stings of the infuriated insects, which seem unable to penetrate its feathers. When its favourite food is not to be had, it will feed upon corn, earth-worms, beetles, slugs, small birds' eggs, and moles—a diet sufficiently

Photo by Scholastic Photo. Co. [*Parson's Green*

SECRETARY-BIRD

In full plumage the tail of this bird is much longer

strange for a bird of prey. Honey-buzzards appear to be exemplary parents, for they are said to construct a bower of leafy boughs above the nest to screen the young from the sun, the boughs being replaced as they wither by fresh ones.

The honey-buzzard occurs but rarely in England, and nowhere appears to be a very common bird, though it is said to be more frequently met with in Arabia and Egypt than elsewhere. On migration, however, it appears in unusually large numbers, the late Lord Lilford recording an occasion when he observed many hundreds crossing the Straits of Gibraltar from Spain to Africa. These were apparently on their autumnal migration to warmer winter quarters.

The dash, energy, and courage which we are wont to associate with the Hawk Tribe have certainly not been manifest in the members of the order which we have examined so far; but these attributes will be evident enough in the majority of the species with which we are now about to deal. One of the most interesting of these fiercer forms is the OSPREY, or FISHING-HAWK. As its name implies, it feeds largely upon fish, which it captures with great dexterity, seizing them either with its feet from the surface of the water, or by plunging entirely beneath the surface, when it disappears amid a shower of spray, to emerge a moment later with a fish writhing in its talons. To ensure a firm grip of its slippery prey, the soles of its feet are armed with rough tubercles, whilst the foot is furthermore remarkable in that the outer toe can be turned backwards, so as to lie parallel with the hind toe — an arrangement rare in birds of the Hawk Tribe, but characteristic of the Owls and some other birds. At times, it would seem, the osprey seizes a fish too large to be raised from the water, when, owing to the firm hold which the claws have taken, the bird is unable to release itself, and is speedily dragged beneath the surface and drowned. Some have suggested that the bird falls a victim, not to inability to free itself, but rather to its obstinacy.

Photo by W. P. Dando, F.Z.S., Regent's Park

EGYPTIAN KITE

Feeding on garbage of all kinds, kites are useful birds in hot countries

The osprey is now rare in Great Britain, though it breeds occasionally in the wilder parts of Scotland. It enjoys an extensive range, however, being found all over the world. In America it appears to be very common. On an island "off the eastern extremity of Long Island, New York," writes Professor Newton, "300 nests were counted. The old birds were rearing their young close together, living as peaceably as so many rooks, and were equally harmless to other birds." Colonies of this kind are rare among birds of prey.

Whilst the fiercer raptorial birds, which hunt and kill their prey, live only upon small or medium-sized animals, a certain section, known as the VULTURES, feed upon the carcases of the largest mammals which they find either in the throes of death or already dead, and even far advanced in decomposition. Gathering to the feast in large crowds, even the largest bodies are soon demolished; and on this account the vultures are to be reckoned amongst the most useful of birds, speedily removing matter which in hot countries would rapidly endanger the health of neighbouring communities.

Many years ago a great controversy was waged over the question of the faculty which guides the vulture in the discovery of its food, since it was a matter of common knowledge that the traveller might sweep the

AUSTRALIAN OSPREY

This species of osprey is confined to Australia and the Austro-Malay Islands

horizon in vain for a sign of these birds, yet, should a camel from a caravan fall out and die, or men fall in warfare, within an incredibly short space of time a crowd of vultures would be squabbling over the dead. Some held that the vulture was guided by scent, others by sight, and this latter view is now almost universally accepted. The bird's natural habit of soaring at an immense height enables it to survey not only immense tracts of country, but the actions of its neighbours soaring at the same altitude, though perhaps miles away. So soon as one descries food it betrays the fact by its actions, making off in the direction of the prospective feast; it is then followed immediately by its yet more distant neighbour, and this by a third, and so the first serves as a guide to all the other soaring birds for miles around. This flight has been admirably expressed by Longfellow in " Hiawatha."

Photo by Charles Knight [*Aldershot*

BEARDED VULTURE

It is called the Bearded Vulture on account of the tuft of bristles hanging from the chin

We need here mention only one or two of the more important species of vulture, and among these one of the most interesting is the LAMMERGEIR, or BEARDED VULTURE. This species is one of the least vulture-like of the tribe, not only in general appearance, but also in habits, and is to be regarded as near the ancestral stock, whose descendants have become more and more addicted to feeding upon dead bodies.

The lammergeir, or bearded vulture, is a bird of large size and majestic flight, differing from all other vultures in that the head and neck are clothed in feathers, whilst the nostrils are covered by long bristles. Beneath the bill hangs a tuft of bristles like those covering the nostrils; hence its name of Bearded Vulture; and this, coupled with a remarkable red rim to the eyes, gives the bird an almost diabolical appearance. It lives partly upon living animals and partly upon carrion, bones apparently being especially relished; these it breaks by dropping them from a height upon the rocks below, probably to get at the marrow. Land-tortoises are treated in a similar manner, and it was possibly this species which caused the death of the poet Æschylus, on whose bare head a tortoise is alleged to have been dropped. It was at one time common in Europe, and is still fairly numerous in West Africa, though rare in the East and South. Many stories are told of its strength and daring, some of which concern the carrying off of young children; but these are probably mythical, modern observers generally agreeing that the bird is by nature far from courageous.

The more typical vultures differ from the lammergeir in having the head and neck more or less bare, and often conspicuously coloured, or covered with a short velvety down. The CINEREOUS, GRIFFON, PONDICHERRY, and EGYPTIAN VULTURES may be cited as examples of these.

The CINEREOUS or BLACK VULTURE is a heavy and repulsive-looking bird, feeding entirely on garbage. On the wing, however, this vulture shares with its relatives the admiration of all who have been privileged to watch it; sailing in graceful circles in the blue sky of the tropics, or hurrying from all quarters of the compass to some ghoulish feast, it forms a spectacle, once seen, never to be forgotten. It is found on both sides of the Mediterranean, and extends eastwards to India and China.

This species, like the GRIFFON-VULTURE, has the head and neck down-covered, thus standing in strong contrast with the PONDICHERRY and SACRED VULTURES of India and Africa, which have bare heads and necks ornamented by loose folds or lappets of skin of a pinkish colour. These vultures hunt in pairs, and are very self-assertive, driving away all other birds from their prey. They build enormous nests of sticks in bushes and trees, thus differing from the vultures previously described, which generally nest on ledges of rock on precipitous cliffs. These nests are made of sticks, lined with straw and leaves. A single egg is laid, which is white with red markings. The largest species rivals the condor in size.

The EGYPTIAN VULTURE, sometimes known as PHARAOH'S HEN, is the smallest of the vultures. The plumage is white; the head, throat, and fore part of the neck are naked and of a lemon-yellow colour; whilst the feet are pink and the eyes crimson. Not only is it a carrion-feeder, but it will also follow the plough, picking up worms and grubs. This species occurs in Europe, breeding in Provence and Savoy, the Madeiras, Cape Verde, the Canaries, North and South Africa, and India. On three occasions it has wandered to Great Britain.

We pass now to the EAGLES, a group the exact limits of which it is impossible to define, since the forms so designated merge insensibly into Buzzards, Hawks, Harriers, and so forth.

Eagles occur all over the world, save only in New Zealand. An eagle, it is interesting to note, is the bird of Jove, the emblem of St. John and Rome, and at the present day of the American Republic. It also plays an emblematic part in Germany, Austria, and Russia.

Of the true eagles, perhaps the best known is the GOLDEN EAGLE, or MOUNTAIN-EAGLE—a British bird, breeding still, though in diminishing numbers, in Scotland. In Ireland it is fast verging on extinction, trap, gun, and poison having wrought its destruction. In times past it bred in the Lake District of England. It is found over the greater part of Europe, Northern Asia, India and China, and Northern Africa, and America as far south as Mexico. It is a very fierce and powerful bird, attacking such

Photo by Scholastic Photo. Co. [*Parson's Green*

GRIFFON-VULTURE

One of the largest of the vultures

Photo by Scholastic Photo. Co. [*Parson's Green*

RÜPPELL'S VULTURE

An African species, closely allied to the griffon

large animals as antelopes, wolves, and foxes, as well as the more helpless fawns, lambs, hares and rabbits, and ducks, geese, grouse, and so on.

Very different from the free-roving golden eagle and its allies is the South American HARPY-EAGLE. This is a denizen of the forest, of great size and enormous strength, as the powerful bill and feet testify. Whilst other eagles are conspicuous for their powers of flight, the present species is rarely seen on the wing, being strictly a forest-dweller, with short wings and tail, and of a somewhat owl-like plumage, the feathers being very soft. At rest it is one of the most striking of all the eagles. The head is crested, the under parts of the body are white, and the upper dark grey, banded with black. It feeds upon sloths, peccaries, and spider-monkeys.

Photo by Scholastic Photo. Co. [*Parson's Green*

ANGOLAN VULTURE

A common West African bird, living upon fish and carrion

So recently as 1897 another forest-dwelling species was discovered in the Philippines, and this also preys largely upon monkeys. Its nearest ally is apparently the harpy-eagle, and, like this species, it is a bird of large size and very powerful. It is further remarkable for the enormous size of the beak, which differs from that of all other members of this group in being much compressed from side to side.

Photo by W. P. Dando, F.Z.S. [*Regent's Park*

PONDICHERRY VULTURE

This Indian species is remarkable for the loose fans of skin which hang down on each side of the head

The sea, as well as the mountain and the forest, is also, as it were, presided over by members of this group, which are in consequence called SEA-EAGLES. One species, the WHITE-TAILED EAGLE, OR ERNE, is reckoned among British birds, though it is fast verging on extinction. In former days it bred on the sea-cliffs of Scotland and Ireland, and in the Lake District. The nest, or eyrie, as it is called, is commonly placed on inaccessible cliffs, but sometimes on the ground or in a tree, and, as is usual with the group, is made of sticks, with a lining of finer materials. This eagle feeds principally upon fish, though hares, lambs, and rabbits and carrion are occasionally taken.

The Hawk Tribe, generally speaking, have the wings comparatively short, the legs long and slender, and the edges of the beak with a sinuous outline and unnotched; but it is impossible to sharply define the group. The best-known species are the SPARROW- and GOS-HAWKS. The first named is still a common British bird, but the latter has now become very

rare indeed. In both species the male is a much smaller bird than the female, and is also more brightly coloured. The GOS-HAWK was at one time used in falconry; it is a bird of extremely ferocious disposition, and in the days when hawks were used for sporting purposes had to be kept very safely tethered, as, if it gained its liberty, it would at once proceed to kill every other hawk and falcon in the "mews."

The Falcon Tribe is divisible into two sections — the one containing the American CARRION-HAWKS, and the other the FALCONS.

The CARRION-HAWKS, or CARACARAS, are long-legged birds which spend most of their time on the ground and run well. They are said to hunt, not seldom in packs, after the fashion of wild dogs. One species at least affords an admirable example of mimicry — so rare among birds. This is the CURASSOW-HAWK, so called from its resemblance to the curassow, one of the Game-birds. The resemblance is evidently advantageous, for thereby the hawk is enabled to sit quietly at rest till its prey comes within easy reach, mistaking the hawk for the inoffensive curassow.

Photo by W. P. Dando, F.Z.S. [*Regent's Park*

EGYPTIAN VULTURE

This is one of the foulest feeders of the Vulture Tribe

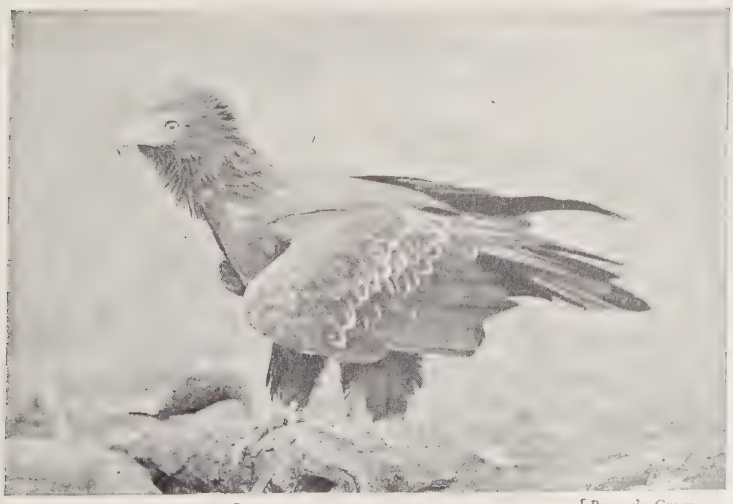

Photo by Scholastic Photo. Co. [*Parson's Green*

WEDGE-TAILED EAGLE

This is an Australian species, feeding chiefly upon carrion

The FALCONS form an exceedingly interesting group, if only on account of the part which they played in the sports of mediæval England. Birds of large size and forms as small as sparrows are included within the group; all are very powerful on the wing, and all feed on living prey, though, in the case of the diminutive forms, this may consist

mainly, if not entirely, of insects. The members of the Falcon Tribe may be distinguished from the majority of the larger hawks by the fact that the eyes are dark hazel-brown instead of yellow, and that the bare, yellow, waxy-looking band of skin at the base of the beak, so characteristic of the Birds of Prey, is not sharply defined, but scantily clothed with fine bristles, passing insensibly into the feathers of the crown of the head.

Some of the best-known members of this section of the group are the PEREGRINE and JER-FALCONS, and the KESTREL, HOBBY, and MERLIN. Only the peregrine and the kestrel, however, can now be called common.

The PEREGRINE is the falcon held so much in esteem by falconers, by whom the female only was called the "falcon," the male, which is smaller, being known as a "tiercel." The female was used for the capture of the larger game, such as herons and rooks; whilst the male was flown only at partridges, and sometimes magpies.

Photo by Dr. R. W. Shufeldt, Washington

AMERICAN SPARROW-HAWK

One of the smallest and handsomest of the American hawks

In a wild state the peregrine falcon is regarded by other birds with the greatest fear and terror. Ducks feeding on the banks of streams or lakes, on perceiving it, immediately take to the water; whilst plovers and lapwings rise to an immense height in the air, and remain there for hours. Mr. Ussher, who has had many opportunities of studying this bird in Ireland, where it is quite common, relates an instance of the tenacity with which it follows its prey, in this case a lapwing. "The falcon," he says, "after several stoops, cleverly avoided by the lapwing, was so near clutching, that the poor bird, quite worn out, dropped into the water, and the falcon, after rising from her stoop, poised a moment on her wings, and then quietly lowering herself with extended legs, lifted the lapwing from the water and bore her off."

The eyrie is generally found half-way up some precipitous cliff: no nest is made, but the eggs are laid on the earth or gravel covering the selected ledge. When eggs are found in a nest, the latter has always been taken from some other bird, even the eagle being occasionally dispossessed. Three or four eggs are laid, which are very beautiful and variable in their coloration. The young are attended by their parents long after they are able to fly.

The JER-FALCONS are birds of large size and great beauty, and at one time were much in request by falconers, probably largely on account of their appearance, for they lack the power and spirit of the peregrine. Grey and black and white and black are distinctive colours of the various species, which are inhabitants of northern regions.

The KESTREL, or WIND-HOVER, is one of the commonest birds of prey, much and most unjustly persecuted by gamekeepers. In its general appearance it closely resembles its much smaller relative, the so-called "SPARROW-HAWK" of America, shown in the photograph on this page by Dr. Shufeldt. The American sparrow-hawk, it should be mentioned, is really a species of kestrel, and, like the British kestrel, belongs to the Falcon group of the Birds of Prey. Like the peregrine falcon, the kestrel does not build a nest, but takes possession of the deserted nests of crows and magpies, or deposits its eggs on the bare earth of a recess in some cliff or quarry which is overhung by a projecting shelf of rock. Occasionally a hole in a tree is chosen, the eggs then resting on the rotten wood at the bottom. That the kestrel is of a more confiding disposition than the majority of its tribe seems to be proved by the fact that it will often deposit its eggs in nesting-boxes, if these are placed in suitable spots. On some

Photo by Scholastic Photo. Co. [*Parson's Green*

VOCIFEROUS SEA-EAGLE

This is an African species

Photo by Scholastic Photo. Co. [*Parson's Green*

IMPERIAL EAGLE

Occurs in Southern Europe and North-west Africa

Photo by W. Saville-Kent, F.Z.S. [*Milford-on-Sea*

CRESTED EAGLE

A powerful and savage bird from South America

Photo by Scholastic Photo. Co. [*Parson's Green*

CHILIAN SEA-EAGLE

This bird feeds on carrion which it finds on the beach

Photo by W. P. Dando, F.Z.S. [*Regent's Park*

ROUGH-LEGGED BUZZARD

Frequent in the British Islands

English estates the harmlessness of this bird is fully recognised, and every encouragement is given it to breed by the erection of these nesting-boxes. By way of illustration we may cite a case where, on an estate in Kent in 1900, five of these boxes were erected 20 or 30 feet from the ground round a single field, all of which were tenanted by kestrels; and though a thousand young pheasants were reared in this field, not a single one of these was missed by the keepers. Besides its human enemies, the kestrel has to contend with crows and rooks, which spare no efforts to seize its eggs whenever the opportunity presents itself. The eggs, it should be mentioned, are of a bright ruddy colour, but, like those of the peregrine falcon, lose much of their freshness of colouring during incubation. Four or five in number, they are laid at intervals of two days or so, incubation commencing with the deposition of the first egg; as a result, the first nestling hatched may be more than a week older than the last.

The food of the kestrel appears to consist mainly of mice, but frogs, earthworms, grasshoppers, cockchafers, and other beetles are also taken. Kestrels will also eat dead animals, as is proved by the fact that they are not seldom found dead from eating poisoned rats laid out for magpies. One instance is on record where a kestrel was taken with its claws entangled in the fur of a stoat, which fiercely defended itself. It is an easy matter, for those who will take the trouble, to find out what is the staple diet of the kestrel; for if the nest and its neighbourhood be searched, numerous small rounded pellets of the size of a chestnut will be found, which, when broken up, will prove to be composed of the hard and indigestible parts of what has been swallowed. The majority of such pellets are made up of the fur and bones of mice.

The little AMERICAN "SPARROW-HAWK," which, as we have already pointed out, is really a species of kestrel, appears to be almost exclusively insectivorous during the summer months, preying mainly upon grasshoppers. An American ornithologist, Mr. Henshaw, writing on the subject, remarks that during a scourge of grasshoppers the sparrow-hawks assembled in hundreds; and although on this occasion, owing to the vast myriads in which these insects had collected, the birds could make no visible impression, yet

Photo by W. P. Dando, F.Z.S.

MARTIAL HAWK-EAGLE

The Hawk-eagles show a marked preference for woody districts

they must have done an immense amount of good. Ornithologists from all parts of the United States unanimously agree that grasshoppers form the staple diet of this hawk, though mice and gophers are also largely eaten, and especially during the winter months, when insect food is scarce.

Of the PYGMY FALCONS there are several species, ranging from the eastern Himalaya, through Tenasserim and Burma, to the Malay Islands and the Philippines. The smallest is the RED-LEGGED FALCONET of Nepal, Sikhim, and Burma. It feeds largely upon insects, such as dragon-flies, beetles, and butterflies, hawking them with a swallow-like speed. Occasionally the members of this little group are said to hunt down and kill birds larger than themselves.

By permission of Percy Leigh Pemberton, Esq.

PEREGRINE FALCON

A favourite in falconry

OWLS

FEW birds have been more misrepresented in literature than the OWLS. For centuries they have been depicted as birds of ill omen, and accused of all kinds of diabolical practices. Shakespeare, for example, repeatedly makes the owl do duty for some evil sign, or fulfil some dire purpose. Thus in *Macbeth*, Act II., Scene ii.,

> It was the owl that shriek'd, the fatal bellman,
> Which gives the stern'st good-night.

Photo by Ottomar Anschütz] [*Berlin*

SPECTACLED OWL

A South American bird with a somewhat remarkable coloration

And later on, in Act IV., it is an owl's wing which he makes the witches add to their caldron of noisome things, when brewing their deadly potion. In Spain the scops and tawny owls are believed to be devil's birds, and are accused of drinking the oil from the lamps suspended before the shrines of saints. The gamekeeper nails their bodies up on the barn door as offenders of the worst type, whilst the Malagasy believe owls to be the embodiments of evil spirits.

It is therefore a relief to find this unwarrantable prejudice is not absolutely universal, since amongst some people, at least, the owl has found some favour. The best-known instance of this is the

Photo by C. N. Mavroyeni [*Smyrna*

EAGLE-OWL

One of the largest owls

case of the Greeks, who made the owl the symbol of wisdom, and chose as an emblem, singularly enough, the species known as the Little Owl, a bird which is notorious for its ludicrous behaviour, so much so that it has earned for itself the reputation of being the veritable buffoon of birds. Its grotesque and ridiculous antics are utilised by Continental bird-catchers, who use it as a lure to attract small birds, tethering it for this purpose near nets, snares, or twigs smeared with bird-lime.

Amongst other birds, strangely enough, the owl appears to be as much disliked as the fiercer and more dangerous members of the Hawk Tribe, and in consequence, should one venture abroad during the day or be discovered in its retreat, the alarm is given, and every small bird within call is summoned to take part in a general mobbing.

Although proverbially unpalatable, the Little Owl is said to be eaten in Italy, as are other species in the various countries in which they are found.

Varying considerably in size, the owls, nevertheless, present a very general uniformity in appearance. All are remarkable for the peculiar softness of their plumage, which imparts to the wings the almost unique power of absolutely silent flight, the sound being deadened or muffled, so that the prey can be approached suddenly, and seized before escape is possible. This is very necessary when hunting in twilight hours. The owls are almost the only birds in which the outer toe is reversible, or capable of being turned either forwards or backwards. Furthermore, the members of this group are remarkable for the fact that the eyes look directly forward, instead of outwards, as in other birds, and that the feathers of the face are arranged round each eye in the form of a disk, and thus impart the familiar owl-like visage, seen elsewhere only among certain of the Hawk Tribe known as "Harriers."

Four species of owl are to be found sparsely distributed over Great Britain. We may regard as the typical owl the species known as the TAWNY or WOOD-OWL. It is the largest of the resident owls in England, and would be much more abundant but that it is subjected to a rigorous and foolish persecution, born of long-standing prejudice and ignorance; it stands accused of the heinous offence of eating game, a charge which has never yet been fully proved. The benefits it confers are great, but, unfortunately, unrecognised, for its chief food consists of rats and mice. This is the bird which gives utterance to that weird "hoo-hoo—hoo-hoo-hoo,"

Photo by W. P. Dando, F.Z.S., Regent's Park

VIRGINIAN EAGLE-OWL

A common North American species, feeding largely on small mammals

AMERICAN BARN OWL.
½ Life-size.

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one of the most charming of the many delightful sounds that break the stillness of the summer nights. It is interesting to note that this species is unknown as a wild bird in Ireland.

Other and fairly common species in England are the LONG- and SHORT-EARED OWLS, both remarkable for the fact that the aperture of the ear, which is of enormous size, is of a different shape on the right and left sides of the head. These owls, furthermore, are characterised by the possession of a pair of feathery tufts, or "horns," springing from the top of the head, which can be erected or depressed at pleasure. These horns are found in many species of owl not necessarily closely related. The species under consideration are of medium size, with large eyes of a most wonderful golden-yellow colour, standing in strong contrast with those of the tawny owl, which are nearly black. Like the tawny owl, these two species, and especially the short-eared, live largely on rats and mice. The last-named bird also devours great numbers of dor beetles and cockchafers.

Amongst the largest of the tribe are the EAGLE- and SNOWY OWLS, both of which are occasionally met with in Great Britain. The eagle-owl may be described as a largely magnified long-eared owl in general appearance, though, as a matter of fact, the two are not very closely related. The snowy owl, as its name implies, is white in colour, the white being relieved by more or less conspicuous black markings. This white livery, assimilating with its snowy surroundings, allows the wearer to approach its prey unperceived on the snow. Whilst the snowy owl is confined to northern regions, the eagle-owl enjoys a wide distribution, and is represented by numerous species, one of which, as we have remarked, occasionally visits Great Britain. The larger species of eagle-owl are the most ferocious members of the order, and prey largely upon hares, rabbits, and the large game-birds; whilst the snowy owl, though selecting similar prey, does incalculable good by devouring those destructive little rodents known as the lemmings.

Photo by Dr. R. W. Shufeldt] [*Washington*

AMERICAN LONG-EARED OWL

This is a young bird which has not yet completely lost its down-feathers

Photo by W. P. Dando, F.Z.S.] [*Regent's Park*

TAWNY OWL

One of the commonest British owls

Solitary as owls usually are, some, as the AMERICAN BURROWING-OWLS, live in what may be called colonies; and, stranger still, they live in burrows, which they share with the original excavators. Occurring both in North and South America, it is not surprising to find that the creatures with whom the burrowing-owls elect to take up their abode are very varied, belonging for the most part to numerous groups of burrowing mammalia. In the prairies of North

Photo by Dr. R. W. Shufeldt [*Washington*

SCREECH-OWL

A common North American bird, feeding on small animals of all kinds

the former group being little bigger than a lark. Thus they stand in strong contrast with the giant snowy and eagle-owls.

Finally, we have the WHITE or BARN-OWL, which with its allies forms a group distinguished from all the other owls by certain well-marked structural characters. The barn-owl is also to be found in Great Britain, but is growing, like all the other owls in that area, more and more rare every year, owing to persecution at the hands of gamekeepers. It is a handsome bird, of a pale buff-yellow, mottled with grey above to pure white beneath, and with the characteristic facial disk peculiarly well developed. It breeds in holes in trees, ruins, and church towers, and feeds almost entirely on mice and rats. From the piercing note which it occasionally utters, it is also known as the SCREECH-OWL.

America they appear to quarter themselves upon the prairie-dogs, ground-squirrels, and badgers; and in the pampas of South America upon the Patagonian cavy, the viscacha and armadillos, and occasionally lizards. It seems to be no unusual thing to find, in addition to the bird and mammal tenants of a single burrow, one or more full-grown examples of the much-dreaded rattle-snake—a truly wonderful happy-family, if all accounts are to be believed. But many competent to speak on the matter throw out dark hints which would appear to show that the owl quarters itself on the tenants of a burrow too weak to resist its intrusion upon their domicile, and that occasionally this most masterful bird renders itself still more objectionable by devouring the progeny of its hosts, and sometimes even the hosts themselves.

The species known as PYGMY OWLS and LITTLE OWLS we mention here only on account of their small size, one member of

Photo by Frans Mouwen [*Breda*

BARN-OWL

This is a British owl, evincing a preference for church-towers in which to roost and breed

Photo by Henry King, Sydney.

AUSTRALIAN COCKATOO.

The sulphur-coloured crest of this bird is arranged in the form of a horse-shoe.

Photo by Ottomar Anschutz, Berlin.

MACAW.

Next to the brilliancy of its colouration, the most striking feature about this bird is its huge beak.

Photo by W. Saville Kent, F.Z.S.

MALE RUFF IN FULL BREEDING PLUMAGE.

This wonderful plumage is worn only for a few weeks in

Photo by Henry King, S

LAUGHING JACKASS.

This bird is a species of Kingfisher, and has acquired its

ut of its most extraordinary cry

CHAPTER X

NIGHT-JARS, SWIFTS, AND HUMMING-BIRDS

NIGHT-JARS

IT is probable that the NIGHT-JARS are the nearest allies of the Owls. As pointed out in the last chapter, although the latter have acquired the habits of the Hawk and Eagle Tribe, they are not really connected with that group by descent.

Soberly clad, so as to be in complete harmony with its surroundings, with large eyes, huge mouth, and peculiarly short beak, beset with long bristles, the night-jar may be distinguished at once from all other British birds. By day it hides, squatting close to the ground, or perched on the thick branch of a tree; but when on the latter, it sits along and not across the bough, like other birds, the complete harmony between its plumage and the bark rendering it as invisible as when on the ground.

Photo by A. S. Rudland & Sons

COMMON NIGHT-JAR

Known also as Fern-owl and Goat-sucker

Not until the spring has far advanced does this bird leave its winter resort in Africa for Europe, making its presence known by its conspicuous habit of hunting its food (which consists of moths and beetles) after twilight has fallen. Later, its extraordinary churring note is heard—

Photo by A. S. Rudland & Sons

PENNANT-WINGED NIGHT-JAR (FRONT VIEW)

The long and graceful plumes are much-lengthened quill-feathers, and by their resemblance to the waving grass in which the bird nests afford protection

a note which has been likened to the noise made by a spinning-wheel, and so powerful as to be audible half a mile off. This note is made while on the ground: on the wing, while toying with its mate, another equally peculiar sound is made, which has been likened to the noise made by swinging a whip-thong through the air.

No nest is made by this bird; but the eggs, two in number and beautifully marked, are laid on the bare ground. The young are covered with down, and remain in the nest for some time.

Another very remarkable feature is the fact that the claw of the middle toe has its inner edge curiously serrated, forming a sort of comb, the function of which is unknown. This comb-like claw occurs also in some few other birds — bitterns, for instance.

A very remarkable kind is the PENNANT-WINGED NIGHT-JAR, in which one of the quill-feathers in each wing is produced into a "pennant" of some 17 inches in length. The shaft of the feather is bare for the greater part of its length, and terminates in a feathery blade. It is an Abyssinian species about which not much is known.

Photo by W. Saville-Kent, F.Z.S. [*Milford-on-Sea*

MORE-PORKS

So called from the note they utter

Some of the night-jars, as the New World NIGHT-HAWK and the Old World EARED NIGHT-JARS, are particularly owl-like, a resemblance imparted by long "ear-like" tufts of feathers which rise from the back of the head. Others, as the MORE-PORK of the Tasmanian colonists, or the FROG-MOUTH, as it is called in Australia, are remarkable for the huge size of the mouth, bounded, as it appears to be, by huge lips, represented by the short, round-edged beak.

Very nearly related to the night-jars is the OIL-BIRD of South America, which lives in caves in Trinidad, Ecuador, and Peru, where it builds a nest which has been likened in appearance to a huge cheese, and in which are laid from two to four white eggs. Like the night-jars, these birds feed by night, emerging from their gloomy retreats at twilight with much noise and in great numbers. Their food, however, is entirely of a vegetable nature, consisting of oily nuts or fruits.

The young, soon after they are hatched, become perfect masses of fat, and on this account are much in demand by the Indians, who make a special business of killing them and extracting the oil.

SWIFTS

In general appearance SWIFTS bear a strong superficial resemblance to Swallows; in reality they are related, not to those harbingers of spring, but to the Night-jars on the one hand and the Humming-birds on the other.

The COMMON SWIFT arrives in England during the early part of May, and stays till the end of August, or sometimes till September has half run its course. Black in colour, relieved only by a white throat, it has little in the sense of beauty to recommend it; nevertheless, there are probably few who do not cherish tender feelings towards this bird.

Photo by H. Saville-Kent, F.Z.S. [*Milford-on-Sea*

MORE-PORK

This is one of the most owl-like of the Night-jars

Photo by F. T. Newman] [*Berkhamsted*

SWIFT

A common British bird during the summer months

The swift has great buoyancy of spirits, as is manifested by the wild, exuberant bursts of screaming to which it gives voice as it rushes in small parties down the lanes or along the less-frequented thoroughfares of towns as morning breaks or evening falls, and occasionally throughout the day. The greater part of its life is spent upon the wing (indeed, it appears to rest only when incubating or sleeping), and of all the smaller birds it is the most graceful in flight, turning and twisting in fairy mazes high in the heavens for hours at a time.

The swift chooses for its nesting-place the eaves of houses and holes in church towers, and occasionally a crevice in the face of a quarry. The nest is formed of bits of straw, dry grass, and a few feathers, glued together by a secretion of the salivary glands into a compact crust; in this the bird deposits from two to four white eggs. The young, which are hatched naked and blind, never develop down-feathers, but soon become more or less imperfectly clothed in a mass of tiny spines, representing the budding feathers; these give the bird somewhat the appearance of a young hedgehog.

In adaptation to its remarkable powers of flight, the wing has undergone considerable modification in form, so that it differs from that of all other birds. On the other hand, the legs, being so little required, have diminished considerably, and are remarkable for their smallness — a fact which hampers the bird considerably, should it happen to alight on level ground, for, owing to the great length of the wings, it can arise only with considerable difficulty.

Nearly allied to the common swift is SALVIN'S SWIFT, remarkable on account of its nest, which has been described by Dr. Sharpe as the most wonderful in the world. About 2 feet long and 6 inches in diameter, it looks rather like the sleeve of an old coat than a nest. It is made entirely of the downy seeds of plants, which, floating through the air after the fashion of such seeds, are caught by the birds when on the wing, and, partly felted and partly glued by the salivary secretion, are woven slowly into the characteristic woolly domicile. The site and manner of fixation of the nest are scarcely less wonderful, for it is suspended from the flat surface of some projecting piece of rock on the face of a cliff, and is thus almost inaccessible; yet, as if to make assurance doubly sure, two entrances are made, one at

the bottom, which is really blind, and one at the top, near its foundation, if we may call it so, which leads into the nursery.

Still more swallow-like in general appearance are the diminutive EDIBLE SWIFTS, so called, not on account of the palatability of the birds themselves, but of their nests, which are in great demand by the wealthy Chinese for conversion into birds'-nest soup. It has already been remarked that the salivary glands are unusually active in the swifts, their secretion bearing a very important part in the construction of the nest, and serving as a kind of cement. It is, therefore, not surprising that in some members of the group we find this secretion playing a still more prominent part, forming, at least in one species, the entire material of the nest. "With these nests," writes Dr. Sharpe, "a large trade is done with China from many of the Malayan Islands, over 3,500,000 nests having been known to be exported in a single year from Borneo to the latter country. . . . In Borneo and other places the caves in which the swiftlets build are leased to the collectors for a considerable sum; but it is only the white nests, made of the pure secretion, which are of any real value. The nests of those species which mix into their nests grass or feathers are not appreciated as an article of commerce."

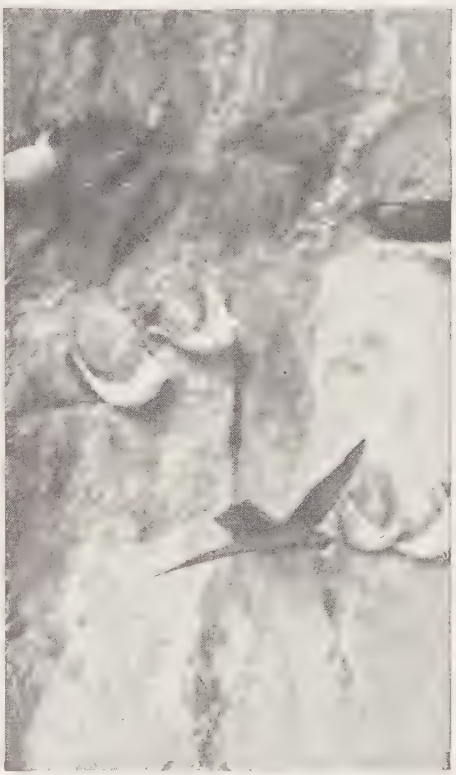

Photo by A. S. Rudland & Sons

EDIBLE SWIFT

The nests of this bird are used for soup; five are seen in this photograph

Colonel Legge gives some extremely interesting particulars concerning the nesting habits of these birds in Ceylon. "It is noteworthy," he writes, "that the partially fledged young — which were procured on this occasion for me, and which I kept for the night — scrambled out on to the exterior of the nest, and slept in an upright position, with the bill pointing straight up. This is evidently the normal mode of roosting resorted to by this species. The interior of this cave, with its numbers of active tenants, presented a singular appearance. The bottom was filled with a vast deposit of liquid guano, reaching, I was informed, to a depth of 30 feet, and composed of droppings, old nests, and dead young fallen from above, the whole mingled into a loathsome mass, with water lodged in the crevices, and causing an awful stench, which would have been intolerable for a moment even, had not the hundreds of frightened little birds, as they screamed and whirred in and out of the gloomy cave with a hum like a storm in a ship's rigging, powerfully excited my interest, and produced a long examination of the colony. This guano-deposit is a source of considerable profit to the estate, the hospitable manager of which informed us that he had manured 100 acres of coffee with it during that season."

HUMMING-BIRDS

It is generally admitted that HUMMING-BIRDS are nearly related to Swifts, with which, however, they stand in the strongest possible contrast in the matter of plumage — the latter being always inconspicuously coloured, whilst the former are for the most part clad in vestments so gorgeous as to render it extremely difficult to describe them in sober language. Moreover, so great is the wealth of species — some hundreds in number — and so varied are the form and coloration, and so closely do the various types pass one into the other, that their classification is a matter of extreme difficulty.

Photo by W. Saville-Kent, F.Z.S. [*Milford-on-Sea*

RUBY-THROATED HUMMING-BIRDS

About 500 distinct species of humming-birds are known

Confined to the American Continent and certain islands adjacent thereto, humming-birds range from Canada to Tierra del Fuego in a horizontal direction, and rise vertically in the mountain-range of Chimborazo to a height of 16,000 feet above the sea-level — "dwelling," as Professor Newton describes it, "in a world of almost constant hail, sleet, and rain, and feeding on the insects which resort to the indigenous flowering plants."

Humming-birds surpass all others in the wondrous beauty of their plumage, which depends not so much on colour as metallic lustre reflecting all the hues of the most precious stones — amethyst, ruby, sapphire, emerald, and topaz gleaming and sparkling from their bodies with a fire and intensity truly marvellous. "In some cases," as Professor Newton aptly describes it, "this radiance beams from the brow, in some it glows from the throat, in others it shines from the tail-coverts, in others it sparkles from the tips of elongated feathers that crest the head or surround the neck as with a frill, while again in others it may appear as a luminous streak across the cheek. . . . The feathers that cover the upper parts of the body very frequently have a metallic lustre of golden green, which in other birds would be thought sufficiently beautiful, but in the [humming-birds] its sheen is overspread by the almost dazzling splendour that radiates from the spots where Nature's lapidary has set her jewels."

Besides this brilliancy of colour and variety in form — variety due to the development of these crests and frills, or to the forking and elongation of the tail-feathers — still further changes are brought about by the modification of the bill, which may be produced into a long straight style, longer than the body of the bird, or turned up like that of the avocet or down like that of the curlew. These changes are adaptations to the bird's methods of feeding, some seeking their food from the long tubular corollas of flowers, and requiring, therefore, very elongated beaks, others from more open and easily accessible flowers, whilst others hunt among leaves, especially the under-surfaces, the quarry consisting mainly of insects attracted by the honey secreted by the flowers, or those living on the leaves. Not only the beak but the tongue also has undergone great modification in this group, its outer sheath curling up on each side into a thin scroll, so as to form a pair of tubes, the exact use of which is unknown. The wings, like those of the swift, have undergone a certain amount of change in the relative proportion of the several regions, and in the form and number of the quill-feathers, whilst the legs have become considerably reduced in size. In some species each leg is surrounded by a little tuft of down, which may be black, brown, or snow-white in colour. In size these birds vary from 8 inches to scarcely more than 3 inches.

"The beautiful nests of humming-birds," writes Professor Newton, "than which the fairies could not have conceived more delicate . . . will be found on examination to be very solidly and tenaciously built, though the materials are generally of the slightest — cotton-wool, or some vegetable down, and spiders' webs. They vary greatly in form and ornamentation — for it would seem that the portions of lichen which frequently bestud them are affixed to their exterior with that object, though probably concealment was the original intention. They are mostly cup-shaped; and the singular fact is on record, that in one instance, as the young grew, the walls were heightened by the parents, until at last the nest was more than twice as big as when the eggs were laid and hatched."

CHAPTER XI

PARROTS, CUCKOOS, AND PLANTAIN-EATERS

PARROTS

THE art of taming wild animals," writes Mr. Jenks in his "History of Politics," "and making them serve the purposes of man, is one of the greatest discoveries of the world." He holds — and there can be little question as to its reasonableness — "that the domestication of animals converted the savage pack into the patriarchal tribe," and that the earliest domesticated animals were pets. How great a share, then, PARROTS may have had in this civilisation and advancement no man can tell, for it is impossible to say how long these beautiful birds may have been esteemed as pets, or how early they were introduced to the notice of the civilised peoples of past generations. Certain it is, however, that for more than 2,000 years they have been held in the highest esteem.

Modern discovery has added enormously to the list of known parrots, so that to-day more than 500 different species have been described, and these may be divided into NESTORS, LORIES, COCKATOOS, COCKATEELS, MACAWS, and KAKAPOS.

Photo by W. Reid] [*Wishaw, N.B.*

KEA

Also known as the Mountain-nestor

Photo by D. Le Souef] [*Melbourne*

NEW ZEALAND KEA

The kea frequents the slopes of lofty snow-covered mountains

Of the first named, the best known is the KEA, or MOUNTAIN-NESTOR, of the South Island, New Zealand. Dull in coloration, and not striking in appearance, it has earned an unenviable notoriety, which appears to rest as much upon fable as upon fact. It seems that, since the introduction of sheep into this part of the world by the settlers, this bird has found a diet of flesh more stimulating than one of fruit. Exactly how this came to be is not known. Two explanations have been advanced. The first has it that the birds settled on the skins of the sheep slaughtered for their wool, and picked off pieces of fat therefrom, as well as various tit-bits from the carcases of the same, and thus found out how toothsome — or beaksome — mutton was. From this they went a step further, and did the slaughtering for themselves. Parties of them now go a-hunting, worry a sheep till exhausted, then dig down through the back, and so wound the intestines that death results. Another explanation is that the birds in the original instance mistook the sheep's backs for the huge masses of lichen common to this region, of which the birds are very fond. Not finding it to their taste at the top, they dug deep, and soon came to the flesh, which, like the forbidden fruit, proved more palatable than that which was provided for them by a bountiful Nature. The result is, that they have become a menace to sheep-farmers, and are on this account in danger of extermination. It has, however, been denied recently that the damage inflicted is anything like so serious as was at one time reported, since on one run, where the damage was unusually large, only 1 in 300 sheep was so attacked. This bird has also been said to attack horses.

Very different, in general appearance and in esteem, are the LORIES. Like the Nestors, the tip of the upper jaw, or beak, is smooth, or nearly so; and in this respect these two groups are to be distinguished from all the other parrots; but in the gorgeousness of their plumage they far eclipse their congeners. Absent in New Zealand, they are found elsewhere

throughout the Australasian region, inclusive of Polynesia, and are highly esteemed as pets, combining great beauty with a very docile disposition and considerable talking powers.

The birds of this section are also known as BRUSH-TONGUED PARROTS, from the presence of a remarkable "brush" borne on the end of the tongue. This is a special adaptation, enabling the birds to feed upon honey; some, indeed, have this brush particularly well developed, and are almost entirely honey-seekers, whilst others, wherein the brush is less developed, live largely on fruits. Professor Moseley tells us that honey literally poured from the mouths of BLUE MOUNTAIN-LORIES which he shot at Cape York.

Photo by D. Le Souef [*Melbourne.*

NEW ZEALAND KAKA

The Maoris keep this bird as a lure

The COCKATOOS are abundant in the Australian region, but have their head-quarters in the Malay Archipelago. Besides the familiar white-crested form so commonly kept in England, the group includes an iron-grey coloured bird with a bright red head, and a huge black species, which represents the giant of the order. It is a funereal-looking bird, the largest specimens inhabiting New Guinea. One of its most striking features is the beak, which is of enormous size. Its tongue differs from that of other parrots in that it is slender and cylindrical in shape, and of a deep red colour, instead of thick, fleshy, and black. It frequents, Mr. Wallace tells us, the lower parts of the forest, feeding upon various fruits and seeds, but displaying a marked partiality for the kernel of the canary-nut, which grows on a lofty forest-tree; "and the manner in which it gets at these seeds," writes Mr. Wallace, "shows a correlation of structure and habits which would point to the canary as its special food. The shell of this nut is so excessively hard that only a heavy hammer will crack it; it is somewhat triangular, and the outside is quite smooth. The manner in which the bird opens these nuts is very curious. Taking one end-ways in its bill, and keeping it firm by a pressure of the tongue, it cuts a transverse notch by a lateral sawing motion of the sharp-edged lower mandible. This done, it takes hold of the nut with its foot, and, biting off a piece of leaf, retains it in the deep notch by the upper mandible, and again seizing the nut, which is prevented from slipping by the elastic tissue of the leaf, fixes the edge of the lower mandible in the notch, and a powerful rip breaks off a piece of the shell. Again taking the nut in its claws, it inserts the very long and sharp point of the bill, and picks out the kernel, which is seized hold of, morsel by morsel, by the extensile tongue."

Of the typical parrots, the best known is the common GREY AFRICAN PARROT, with a red tail, so valued on account of its great talking powers. Other species of this section which should be mentioned here are the PYGMY PARROTS, MACAWS, HAWK-BILLED PARROT, BUDGERIGARS, and OWL-PARROT.

The first named are the smallest of all the tribe, remarkable as well for the splendour of the plumage as their size, which is less than that of the common sparrow.

The LONG-TAILED MACAWS, representing the most showy and gaudily coloured of all the Parrot Tribe, inhabit the tropical forests of South America. Mr. Bates describes a flock of scarlet-and-blue macaws, which he came across one day, as looking like a cluster of flaunting banners among the crown of dark green leaves of a bacaba-palm.

The superb HYACINTHINE MACAW is one of the rarest of the Parrot Tribe, and was found

Photo by W. Saville-Kent, F.Z.S.

BLACK COCKATOO

Found in pairs in thick forests

The HANGING-PARROTS are about the same size as the well-known "love-birds," and remarkable for their habit of sleeping suspended head-downwards by one foot from the boughs of trees. They are all brilliantly coloured birds, and have a fairly wide range, extending from India and the Philippines through the Malay region as far east as Duke of York Island.

The Australian BUDGERIGARS, or GRASS-PARRAKEETS, need no description here; but it is interesting to note that nearly allied to them is a small species known as the SWAMP- or LONG-TAILED GROUND-PARRAKEET. As its by Bates in the interior of Brazil. As its name implies, it is of a deep hyacinthine colour, relieved by a bare patch of pure white skin round the eyes. It feeds on the nuts of several palms, especially those of the macuja. These nuts, which are so hard as to be difficult to break without a heavy hammer, are crushed to a pulp by the powerful beak of this macaw.

Crests among parrots are common enough, but only one species wears a frill; this is the HAWK-BILLED PARROT of the Amazon Valley. It is closely related to the large and well-known AMAZON PARROTS, and has been aptly described as a most extraordinary bird. Its coloration is striking—green above, with a brown head; the frill or ruff around the neck shows up in strong contrast, being dark red, with blue edges, and barred with blue. The feathers of the breast and abdomen, like the frill, are also red and blue, whilst the under-surfaces of the tail and wings are black. It is only when the bird is excited or angry that the ruff is raised.

Photo by Scholastic Photo. Co. [*Parson's Green*

COCKATOO

Cockatoos in a wild state often congregate in immense flocks

Photo by Ottomar Anschütz] [Berlin

LEADBEATER'S COCKATOO

Has a red crest, banded with yellow and tipped with white

name implies, it is a ground-dwelling species, and, in accordance with this habit, has considerably longer legs than the tree-haunting species. This lengthening of the leg in arboreal species is seen also among pigeons and many other birds.

The most interesting, perhaps, of all the parrots is the remarkable KAKAPO, or OWL-PARROT, of New Zealand. Like the species just described, it is also a ground-dweller; furthermore, it differs from all other members of the tribe in being flightless, and, like the flightless members of the Ostrich Tribe, has completely lost the deep keel from the breast-bone, which gives support to the muscles which move the wings. It is a large bird, green in colour, mottled with yellow and black, and derives its name of Owl-parrot from the fact that the feathers of the face radiate from the eye outwards to form a kind of disk. When eating grass, it is said to graze, nibbling after the fashion of a rabbit. Occasionally it is said to climb trees, descending with extended wings, so as to break the force of its career. It has been described as a playful and affectionate pet in captivity, displaying also great cleverness and intelligence. Unfortunately it is growing more and more rare, so that its final extermination is only a question of time—the ravages of dogs, cats, and pigs, introduced by the settlers, being mainly the agents of destruction.

Once common all over New Zealand, the range of the owl-parrot is now restricted to the mountainous regions of North Island and the northern half of South Island. During the day it remains concealed in the holes in rocks or under roots of trees, and if disturbed is difficult to rouse. When taken from its retreat, it runs swiftly, and tries to hide, seeking shelter, if possible, under a heap of soft, dry grass. At sunset, however, it becomes very animated, and travels — at least when possible — in companies, making tracks a foot or more wide across the herbage. It feeds greedily upon mosses, ferns, seeds, berries, and, it is said, even lizards, giving vent, when devouring some favourite morsel, to a kind of grunting noise.

Photo by C. Reid] [*Wishaw, N.B.*

MACAW

The flight of these gorgeously clad birds is very powerful

The kakapo nests in holes under trees and rocks, laying two or three eggs, which, like those of the Parrots, are white.

The natives take advantage of its feeble powers of flight, hunting it on foot by torchlight, aided by dogs, which, it is said, are not seldom seriously wounded by the powerful bill.

When the breeding-season is over, these birds appear to live in small communities, four or five occupying the same hole. They are apparently gifted with some foresight, inasmuch as they lay up a store of food, to be drawn upon during bad weather.

Cuckoos and Plantain-eaters

The Cuckoo Tribe is somewhat unfortunate in that the numerous members of which it is composed are completely overshadowed by the prominence which has been given to the Common Cuckoo. Few birds, indeed, have managed to secure so much attention, the poet in particular having sung its praises without stint. This enthusiasm undoubtedly is but an echo of the general popular sentiment, for there are few birds to which the British extend a more hearty welcome, its well-known cry possessing a peculiar charm for lovers of the country. Coming in April, and leaving again in July, its stay is of the shortest; but during the greater part of this time its whereabouts may generally be known by the familiar call "cuckoo, cuckoo," though undergoing certain characteristic changes as the months glide by.

Apart from its song, one of the most interesting things concerning the cuckoo is the fact that it goes about in disguise — the disguise of the ass in the lion's skin with a vengeance; for it is clothed in the garb of that terror of the countryside, the sparrow-hawk. Nay, more; it has also most successfully imitated the flight of that bogy; and this to frighten little birds — not, however, for the mere purpose of creating consternation amongst them, but for far more sinister ends.

Somehow or another, in cuckoo society, the rearing of a family is a responsibility which is utterly repudiated. Great pains seem to have been taken to evade this duty, and yet to ensure the continuity of their distinguished house. The oviparous method of reproduction, which obtains in the feathered world, has been turned to good account — in fact, everything depends upon this. It seems to have suggested itself as far more convenient to drop an egg here and there into a neighbour's nursery, and leave the work of bringing it to life to the owners thereof. But to carry out this system of distributing foundlings requires tact,

Photo by Kerry & Co.] [Sydney

BLUE MOUNTAIN-PARROTS

A honey-eating species

Photo by J. Peat Millar] [*Beith*

YOUNG CUCKOO EJECTING EGG

The egg is held in position by the head and wings

cunning, and the mutual co-operation of both the male and his—at least temporary—wife; hence the disguise. The plan of execution very frequently adopted is for the male to hover over the treasure-house of the intended foster-parents hawk-wise. This is sure to call forth an attack from the poor little wretches threatened, which ends in an apparently hasty retreat of the marauder, followed by his fearless assailants. No sooner is the coast clear, however, than the wily female, taking her egg in her beak, slips quietly up to the nest and deposits her burden.

Let us imagine that this home so lately threatened is that of the modest little hedge-sparrow, and take a peep during the absence of the owners, after quiet has established itself once again. Lying side by side with the tiny sky-blue eggs of the hedge-sparrow we should find the relatively large, greyish-green or reddish-grey egg of the cuckoo. What a contrast! If the hedge-sparrows notice this too, they evidently do not mind, for they invariably hatch it with their own.

But some birds are not so accommodating as this, and would ruthlessly destroy or reject any egg surreptitiously introduced into the nest. Consequently more deception has to be practised. The hawk-like garb still serves its purpose to draw off the intended dupes from the nest; but this is not enough, for to deposit an egg of the normal cuckoo type would be worse than useless, since it would meet with instant destruction on the return of the owners of the nest. But the cuckoo, strange to say, has proved equal to the occasion, and meets the difficulty by laying an egg to match those in the nest. The Redstart, Wagtail, Sedge-warbler, Red-backed Shrike, and Meadow-pipit may be cited as instances of—shall we say exclusive?—birds which must be circumvented by "colourable imitations." Perhaps the most wonderful of the cuckoo successes in this direction is the imitation of the redstart's egg, which is blue.

Naturally these facts have given rise to much speculation, but even now we cannot regard the discussion as finally settled. Some ornithologists held that the egg of every individual cuckoo was subject to great variations, and that the place of deposit of each egg was determined

only after the bird had ascertained its colour. If this were true, surely we should find blue cuckoos' eggs in hedge-sparrows' as well as redstarts' nests. But we don't! Others have sought to explain the existence of mimicking eggs to the influence of the food peculiar to the foster-parent upon the germ of the young female cuckoo, which, through this channel, became transmitted to all its descendants. To support this hypothesis it was necessary to throw overboard the old individual variability explanation, and to adopt one that is certainly nearer the truth — to wit, that each cuckoo chooses the nest of that species in which itself was reared as a depository, in turn, for its own egg, and only when such is not available will it select some other species, and trust to luck for its adoption. This would certainly account for many anomalies; but as it seems that there are more eggs unlike than like those of the selected foster-parents, it cannot be a perfect explanation.

A third explanation takes that part of the second for granted which assumes that cuckoos select nests of the species which served them as foster-parents, and explains the mimicry, when this occurs, as due to the results of natural selection.

Our interest, however, in the domestic economy of the common cuckoo is not to be allowed to drop with the incubation of the egg. The perfidy of the parents seems to have cast a sombre shadow over the cradle of the offspring, an evil spell destined to bear fruit with terrible suddenness; for the young, before it is many hours old, and while yet blind and naked, perpetrates its first act of wrong-doing by committing murder! There is no case here of wilful or ignorant misrepresentation and slander, such as many of our feathered friends are made to suffer at our hands—no foolish prejudice such as has blasted the reputation of some of our most guiltless and useful of bird-citizens. The witnesses of the crime of which we speak are many and unimpeachable. The facts are as follows: —

The parent cuckoo deposits her egg in the nest of some other bird with those of the owners thereof. All are hatched. In a few hours after the arrival of the young cuckoo the foster-brothers and -sisters invariably disappear, and are not seldom found in the immediate neighbourhood of the nest. That they must have been removed by force is certain; but this force cannot be attributed to the natural parents. The evidence of the first witnesses, therefore, was worthy of all consideration; and since their accounts have been frequently

Photo by Billington] [*Queensland*

PHEASANT-CUCKOO

The hind toe terminates in a spur-like claw; hence these cuckoos are known as Lark-heeled Cuckoos

confirmed by most trustworthy observers, we must now admit the charge proved. One of the best known of these accounts is that of Mrs. Hugh Blackburn. She has given us a vivid picture of this most extraordinary of domestic tragedies. The victims in this instance were meadow-pipits. Finding a pipit's nest with a cuckoo's egg therein, she kept it carefully under observation. At one visit she found the pipits hatched, but not the cuckoo. Forty-eight hours later the cuckoo had not only arrived, but ousted his foster-brothers and -sisters, who were found lying outside the nest, but yet alive. They were replaced beside the cuckoo, which at once reopened hostilities for the purpose of maintaining its absolute possession of the nursery. This it did by burrowing under one of them, which, balanced upon its back, it proceeded to eject by climbing up the nest tail-foremost, till, reaching the brim, it could relieve itself of its burden by heaving it over the edge and down the bank. Pausing a moment, it then felt backwards with its wings to make sure the pipit was really gone, and, having satisfied itself on this point, subsided to the bottom of the nest. Next day, when the nest was visited, the remaining pipit was found outside the nest cold and dead. "But what struck me most," she writes, "was this: the cuckoo was perfectly naked, without a vestige of a feather or even a hint of feathers, its eyes were not yet opened, and its neck seemed too weak to support the weight of its head. The pipits had well-developed quills on the wings and back, and had bright eyes partially opened, yet they seemed quite helpless under the manipulations of the cuckoo, which looked a much less developed creature."

The GREAT SPOTTED CUCKOO of South Europe and North Africa is a species which, though parasitic, does not seem to have sunk to such a depth as the common cuckoo. Its eggs very closely resemble those of certain magpies and crows within its breeding-area, and it is in the nests of these that they are deposited. We may assume that mimicry has been resorted to, and become perfected by the same means as have accomplished this end in the case of the common cuckoo. We notice here, however, two points of difference therefrom. In the first place, from two to four eggs are left in each nest instead of one; and, secondly, the young cuckoos seem to live in perfect amity with their foster-brothers and -sisters — there is no ejection of the rightful heirs.

Photo by J. T. Newman [*Berkhamsted*

CUCKOO ONE DAY OLD IN HEDGE-SPARROW'S NEST

The young bird has its mouth open, ready for all the food the foster-parents can collect

Having pledged themselves to a course of deception and treachery, there is no telling the lengths to which such conduct may lead. We have already seen that the bird has succeeded in laying what we may call forged eggs, but we come now to an instance where the young has also to be disguised. This is furnished by a species of cuckoo known as the KOEL, inhabiting Palawan, an island in the Philippines. This bird shifts its parental duties upon the shoulders of a species of myna inhabiting the same island. Now, the mynas are black, and their young, as is often the case where both sexes are coloured

alike, resemble the parents, and are black likewise. With the cuckoo the case is different. The male and female are conspicuously different in coloration, the former being black, the latter brown. In such cases it is the rule for the young to wear the livery of the female. If this rule were adhered to in the case of the cuckoo, destruction would be more than probable, for the mynas would as likely as not destroy so outrageous a departure from myna custom as a brown youngster. But the koel has proved equal to the occasion, by the simple expedient of attiring the young in the male instead of the female livery. Later on in life the rule for the exchange of plumage is reversed, and the young female doffs the temporary black dress of the male for the brown one of the adult female, instead of *vice versâ*.

Photo by J. T. Newman [*Berkhamsted*

YOUNG CUCKOO

A young cuckoo remains in the nest till fully fledged

All cuckoos, however, are not parasitic, the species known as LARK-HEELED CUCKOOS — from the presence of a long, spine-like claw on the hind toe — building a nest and hatching their own eggs. They have a wide range, being found in Africa from Egypt to Cape Colony, Madagascar, India, China, New Guinea, and Australia.

As a rule, the Cuckoos are not conspicuously coloured, but some species are clad in a livery resplendent with metallic colours. These are represented by the Indian and Australian BRONZE CUCKOOS and the African GOLDEN CUCKOOS. One of the most beautiful of all is the African EMERALD CUCKOO, in which the upper-parts are of a vivid emerald-green, whilst the under-parts are bright yellow.

Finally, we must mention the GROUND-CUCKOOS, which are comparatively long-legged, terrestrial forms, with small wings. One of the best known is an inhabitant of the Southern United States, from Texas to New Mexico, Southern Colorado, and California. "It has obtained the name of ROOD-RUNNER," writes Dr. Sharpe, "from the speed with which it flies over the ground, some idea of which may be gained from a statement of Colonel Stevenson, that, when in Southern California, he saw, on two occasions, the ranchmen of that part of the country chase one of these birds on horseback for a distance of a mile or more at full speed, when the cuckoo, though still in advance, would suddenly stop and fly up among the upper limbs of some stunted tree or bush near the roadside, and the rider, having kept the bird in view all the way, would dismount and easily take the exhausted bird from its perch alive."

That the African PLANTAIN-EATERS, or TOURACOS, are related to the Cuckoos there can be no doubt, although they do not bear any very close superficial resemblance to them. Striking in appearance and of beautiful plumage, they owe as much of the interest which now centres on them to the chemist as to the ornithologist. Long ago it was noticed that the rich crimson colour of the wing-quills disappeared after exposure to a heavy rain, having been

Photo by F. T. Newman

YOUNG CUCKOO IN REED-WARBLER'S NEST

This photograph was taken in August, an unusually late date to find these birds in the nest

apparently washed out—a supposition justified by the discovery still later that the water in which captive species had been bathing was strongly tinged with colour. A little more than thirty years ago these facts came under the notice of Professor Church, who, as a result of a thorough examination of the mystery, was enabled to announce the discovery of a new animal pigment containing copper, which he called "turacin."

There are twenty-five different species of plantain-eaters, which are divided into two groups — those which have red in the quills and those without. All are forest-dwellers, feeding upon various wild fruits, building a nest of sticks resembling that of a pigeon, and laying therein three white eggs. The majority of the species are crested and brilliantly coloured, but a few are quite soberly clad. The largest of the tribe is nearly 3 feet long, and a brief description of its coloration will serve to convey a notion of the beauty of the more gorgeously clad members. In this species, then, the upper surface of the body is blue, the tail yellow, with a blue base and black bar across the tip, the under surface of the body rufous brown, the bill yellow, with a scarlet tip, and the eye red.

Though the tops of the highest trees seem to be their favourite resort, these birds are found also among the dense tangled masses of creepers near the ground, flitting, when disturbed, in graceful curves, and alighting with crest erected and the tail turned sharply upwards. The powers of flight appear to vary among the different species, some being described as decidedly clumsy on the wing, whilst others, on the contrary, are light and graceful. Shy and very restless, they are very difficult to procure, when wounded running with great speed, and taking shelter in holes in trees. Their flesh is esteemed a great delicacy by the natives. Save during rain or the heat of midday, they appear to be very noisy birds, having a harsh note, varied with cat-like mewings.

CHAPTER XII

ROLLERS, KINGFISHERS, HORNBILLS, AND HOOPOES

CROW-LIKE birds of brilliant coloration, the ROLLERS have earned their name from the habit of occasionally rolling or turning over in their flight, after the manner of tumbler-pigeons. One species at least visits Britain occasionally, only to be shot down at once by the insatiable pot-hunter and collector of rare birds. They are birds of wide distribution, occurring over the greater part of the Old World, and, as we have already remarked, of brilliant coloration, blue and green, varied with reddish, being the predominating colours. As with all birds of beautiful plumage, they are subjected to much persecution,

Photo by W. Saville-Kent, F.Z.S.] [*Milford-on-Sea*

AUSTRALIAN LAUGHING-KINGFISHER

The Laughing-kingfisher, or Laughing-jackass, derives its name from its extraordinary note, resembling a demoniacal laugh

Photo by W. F. Figgott] *[Leighton Buzzard*

KINGFISHERS AT HOME

The plumage of this bird is remarkable for the beauty of its iridescent hues

thousands upon thousands being killed every year in India alone, to supply the demands made by milliners for the decoration of ladies' hats.

Rollers frequent forest country, and travel in pairs or in small companies: some species are entirely insectivorous; others eat also reptiles, frogs, beetles, worms, and grain. Four or five white eggs are laid in a nest made of roots, grass, hair, and feathers, and built in walls, under the eaves of buildings, or in holes of trees or banks.

Equally beautiful as a whole, and far more widely known, are the KINGFISHERS. But just as the common cuckoo has come to overshadow the rest of its tribe, so the COMMON KINGFISHER eclipses all its congeners. For centuries a wealth of fable, held together by a modicum of fact, served to secure for this bird a peculiar interest; whilst to-day, though shorn of much of the importance with which these fables had invested it, this kingfisher is still esteemed one of the most interesting and beautiful of its tribe.

Green and blue are the predominating colours of its upper- and bright chestnut-red of its under-surface; but owing to structural peculiarities of the feathers of the upper-parts, the reflection of the green and blue areas changes with the direction of the light from which the bird is viewed, in the same way that the peacock's train-feathers change according as the light falls upon them.

As is the rule where both sexes are brilliantly coloured, this bird breeds in a hole, which in the present species is generally excavated in the bank of a stream, but sometimes in an old gravel-pit or chalk-pit, a mile or even more from the water. Occasionally the crumbling soil under the roots of an old tree affords sufficient shelter. No nest is made, although what is equivalent to a nest is ultimately formed from the bird's habit of ejecting the indigestible parts of its food on to the floor of the space in which the eggs are laid. In course of time this becomes a cup-shaped structure; but whether, as Professor Newton remarks, by the pleasure of the bird or the moisture of the soil, or both, is unknown. With care the nest may be removed entire, but the slightest jar reduces the whole to the collection of fish-bones and crustacean skeletons of which it was originally composed. There is a tradition, not yet extinct, to the effect that these "nests" are of great pecuniary value, and scarcely a year passes without the authorities at the British Museum being offered such a treasure, at prices varying from a few pounds to a hundred. The nest-chamber is approached by a tunnel sloping upwards, and varying from 8 inches to 3 feet in length, terminating in a chamber some 6 inches in diameter, in which the eggs are laid. These, from six to eight in number, have a pure white, shining shell, tinged with a most exquisite pink colour, which is lost when the eggs are blown.

The young seem to be reared under very unsanitary conditions, for the ejected fish-bones and other hard parts are not reserved entirely for the nest, but gradually distributed along

the tunnel approaching it; later, fish brought for the young, but dropped on the way, and the fluid excreta of the parents are added, forming a dripping, fetid mass swarming with maggots. The young, on leaving the nest, are at first tenderly fed and cared for by the parents, but towards the end of the summer seem to be driven away to seek new fishing-grounds for themselves.

Of the many legends that have grown up around this bird, some are well worth repeating. Specially interesting is one related by Professor Newton on the authority of the French naturalist Rolland. This has it that the kingfisher was originally a plain grey bird, and acquired its present bright colours by flying towards the sun on its liberation from Noah's ark, when its upper-surface assumed the hue of the sky above it, and its lower plumage was scorched by the heat of the setting sun to the tint it now bears. Not a few virtues were also attributed to this bird. Its dried body would, it was believed, avert thunder-bolts, or, kept in a wardrobe, preserve from moths the woollen stuffs contained therein, whilst, hung by a thread from the ceiling of a room, it would serve like the more conventional weather-cock to point the direction of the prevailing wind.

Persecuted though it is, the kingfisher is by no means a rare bird in England, and those who will may generally see it by the banks of some slowly flowing stream or lake, or even shallow brook, sometimes even by the seashore. It feeds upon small aquatic insects and crustacea and small fishes, sometimes even, it is said, upon leeches. Perched on some bough overhanging the water, or stump or railing on the bank, it watches patiently, silent and motionless. The moment its prey comes within striking distance it plunges down upon it, disappearing for a moment beneath the surface, to appear the next with its capture in its beak. If this be a fish, it is held crosswise, and borne upwards to the station from which the plunge was made, there to be stunned by a few sharp blows, tossed into the air, dexterously caught, and swallowed head-foremost. At times, however, perhaps when hunger presses, more activity in the capture of food is displayed, the bird hovering suspended over the water, after the custom of the kestrel-hawk.

Although essentially fish-eating birds, a considerable number live far removed from water, obtaining a livelihood by the capture of insects in forest regions, whilst some appear to feed mainly on reptiles. These are known as Wood-kingfishers, to distinguish them from the Water-kingfishers, the typical member of which group has been just described.

Of WOOD-KINGFISHERS, or KINGHUNTERS, as they are also called, the most beautiful are the RACKET-TAILED KINGFISHERS, so called from the fact that the two middle tail-feathers are produced into two long rods, terminating in a spoon-shaped enlargement. Although represented by no less than twenty distinct species, they have a somewhat limited range, being found only in the Moluccas, New Guinea, and Northern Australia. One of the handsomest of all is the one occurring in Amboina, an island in the Malay Archipelago, where it was discovered by Mr. A. R. Wallace. The

Photo by Scholastic Photo. Co. [*Parson's Green*

LAUGHING-KINGFISHERS

This species has comparatively dull-coloured plumage

Photo by C. N. Mavroyeni [*Smyrna*

KINGFISHER

The photograph shows the nature of the favourite haunts of this species

bill, he tells us, is coral-red, the under-surface pure white, the back and wings deep purple, while the shoulders, head, and nape, and some spots on the upper part of the back and wings, are pure azure-blue. The tail is white, narrowly edged with blue. These birds live upon insects and small land-mollusca, which they dart down upon and pick up from the ground just as the fish-eating species pick up a fish.

Of the forest-haunting species, however, the best known is probably the large and, for a kingfisher, dull-coloured LAUGHING-JACKASS, or SETTLER'S CLOCK, of Australia. Its food is of a very mixed character — small mammals, reptiles, insects, and crabs being devoured with equal relish. Since it is not seldom to be seen bearing off a snake in its bill, it may be regarded as a useful bird — supposing, of course, the snake to be of a poisonous variety. A good idea of the bird in its native haunts is given by the late Mr. Wheelwright. "About an hour before sunrise," he writes, "the bushman is awakened by the most discordant sounds, as if a troop of fiends were shouting, whooping, and laughing around him in one wild chorus. This is the morning song of the 'laughing-jackass,' warning his feathered mates that daybreak is at hand. At noon the same wild laugh is heard, and as the sun sinks into the west it again rings through the forest. I shall never forget the first night I slept in the open bush in this country. It was in the Black Forest. I woke about daybreak after a confused sleep, and for some minutes I could not remember where I was, such were the extraordinary sounds that greeted my ears: the fiendish laugh of the jackass, the clear, flute-like notes of the magpie, the hoarse cackle of the wattle-birds . . . and the screaming of thousands of parrots as they dashed through the forest, all giving chorus, formed one of the most extraordinary concerts I have ever heard, and seemed, at the moment, to have been got up for the purpose of welcoming the stranger to this land of wonders on that eventful morning. I have heard it hundreds of times since, but never with the same feelings that I listened to it then. The laughing-jackass is the bushman's clock, and being by no means shy, of a companionable nature, and a constant attendant on the bush-tent and a destroyer of snakes, is regarded, like the robin at home, as a sacred bird in the Australian forests. It is an uncouth-looking bird . . . nearly the size of a crow, of a rich chestnut-brown and dirty white colour, the wings slightly chequered with light blue, after the manner of the British jay. The tail-feathers are long, rather pointed, and barred with brown. . . . It is a common bird in all the forest throughout the year, breeds in the hole of a tree, and the eggs are white."

Whilst the Kingfishers are remarkable for the wondrous beauty of their coloration, the HORNBILLS, their allies, attract our attention rather by the grotesqueness of their shape, due to the enormous size of the bill, and the still more remarkable horny excrescences which surmount it in not a few species, forming what is known as a "casque." Absent in some of the smaller and possibly more primitive forms, its gradual development may be traced, beginning

with a series of corrugations along the ridge of the base of the bill, gradually increasing, to form, in the most extreme cases, huge superstructures of quaint shapes, and apparently of great solidity. As a matter of fact, however, these casques are practically hollow, save in the case of the HELMET-HORNBILL of the Malay countries, in which the horny sheath is backed by solid supports of bone, whilst the front of the sheath itself is of great thickness and surprising density, and is used by the natives for carving and making brooches and other ornaments. The use of this powerful hammer — for such it may possibly be — is unknown.

Hornbills are forest-birds, feeding upon fruit and insects, the latter being captured on the wing. With large bill and wings, a long tail, and a relatively small body and short legs, they are rather unwieldy birds, and yet, for many reasons, unusually interesting. Their nesting habits are unique, and quite worth recounting here at some length. Of the many accounts, one of the most interesting, as well as one of the latest, is that of Mr. Charles Hose, of Borneo.

"The nest," he writes, "is always built in the hollow of a large tree — the hollow, be it noted, being always due to disease of the tree or the ravages of termites, not to the personal labours of the birds. The bottom of this cavity is often plugged by a termites' nest and accumulation of decayed wood, and on the upper surface of this is made the nest, a very rough-and-ready structure, composed simply of the feathers of the female. The hollow of the tree communicates with the exterior air by means of a long aperture, which, just before the period of incubation, is closed up almost entirely by the male, simply leaving a long slit open, up and down which the beak of the enclosed female can move. The substance used in thus closing the aperture closely resembles some vegetable resin, and is probably composed of a gastric secretion, combined with the woody fragments of fruit. It should be noticed that this slit is always in close proximity to the nest, so that the female can easily protrude her beak

Photo by W. Reid] [*Wishaw, N.B.*

LAUGHING-JACKASS

Frequently known as the Settler's Clock

Photo by Scholastic Photo. Co.]

CRESTED HORNBILL

The Hornbills derive their name from the great size of the bill

for food without moving from her sitting position. During incubation the male bird supplies the female with food in the form of pellets of fruit, seeds, insects, portions of reptiles, etc., the pellets being enclosed each in a skin of rubber-like consistency. While feeding the female, the male clings to the bark of the tree, or sits on a branch if conveniently near, and jerks these pellets into the gaping beak of the hen, two to four pellets forming a meal. During mastication (for it is a mistake to suppose that the hornbills always bolt their food entire) some fragments of the pellets fall to the ground, and seeds which these fragments may contain take root, germinate, and sprout, and the natives can judge approximately of the date of incubation by the age of the seedlings. When these are four-leaved, the eggs have been hatched out for two or three weeks. At this stage, though not always so early, the mother bird leaves the nest, breaking down the gluey substance with her beak to effect an exit; having left the nest, the aperture through which she left is carefully closed up again, leaving the slit as before, and now both male and female devote their energies to feeding the young birds, which in course of time follow the example of their mother and leave their place of imprisonment. It is more than probable that this gluing up first of the mother bird and her eggs and afterwards of the nestlings alone is solely a means of protection against predacious carnivora. . . .

"The nesting-season is during May and June, and it is noteworthy that the birds, if undisturbed, return to the same nesting-place every year. The saplings at the foot of the tree, sprung from seeds dropped in the first year of paring, afford signs to the natives of the number of years during which the tree has been occupied. If during paring or incubation the female or female and young are destroyed, the male takes to himself another mate, and repairs to the same nesting-place; if, however, the male and female are destroyed, the nest is never reoccupied by other pairs. An interesting incident was observed while on Mount Dulit. Espying on a tree the external signs of a hornbill's nest, and a male rhinoceros perched close by, I shot the male, and while waiting for my Dyak collectors to make a ladder up the tree to secure the female, I observed several young male birds fly to the nest and assiduously ply the bereaved widow with food, a fact which seems to indicate a competition in the matrimonial market of the bird-world as severe as that among human beings. It is no easy matter to procure embryos or nestlings of hornbills, for the natives are inordinately fond of both as articles of diet, and, further, are always anxious to secure the tail-feathers of the adults to adorn their war-coats and hats.

"The native method of catching the female during incubation is ingenious, though

decidedly brutal. The tree is scaled, the resin-like substance is broken away, and the frightened bird flies from her nest up the hollow trunk of the tree, but is ignominiously brought down by means of a thorny stick (the thorns point downward), which is thrust after and twisted about until a firm grip in her plumage is obtained. The Dyaks, never very faithful observers of nature, believe that the female is shut up by the male, so that after hatching her eggs she may die, the maggots in her putrefying body affording food for the young. One very curious habit of the rhinoceros-hornbill which I have not hitherto seen noted is the rapid jumping up and down on a branch with both feet together. This jumping motion is imitated by the Kyans and Dyaks in their dances, the figure being known to the Kyans as 'wan blingong.'"

Photo by W. P. Dando, F.Z.S. [*Regent's Park*

CONCAVE-CASQUED HORNBILL, INDIA

The noise made by hornbills on the wing is said to resemble that of a steam engine

That the HOOPOES, unlike as they may be in general appearance, are nevertheless intimately related to the Hornbills there can be no doubt. Graceful in contour and pleasing in coloration, it is a pity that the species which so frequently visits Britain, and has on more than one occasion nested there, should be so ruthlessly shot down immediately its presence is discovered. Save the wings and tail, the body is of a light cinnamon colour, whilst the head is surmounted by a magnificent crest of black-and-white-tipped feathers, which can be raised or depressed at the pleasure of the bird: the excepted portions of the plumage — the wings and tail — are buff, varied with bands of black and white. Thus it may be truthfully said to be a conspicuously coloured bird; yet this same livery seems also to come under the head of protective coloration, for we are assured that, when danger threatens, the bird throws itself flat upon the ground, spreads out its wings, and at once becomes transformed into what rather resembles a heap of rags than a bird. Escape by flight, however, instead of subterfuge, seems also at times to be resorted to, since, when pursued by a falcon, it will mount rapidly to a great height, and not seldom effect its escape.

Photo by Scholastic Photo. Co. [*Parson's Green*

GROUND-HORNBILL

The legs of the ground-hornbill are much longer than those of its allies

The domestic habits of the hoopoe are, however, by no means so charming as one would expect to find in so beautiful a bird. "All observers agree," writes Professor Newton, "in stating that it delights to find its food among filth of the most abominable description, and this especially in its winter quarters. But where it breeds, its nest—usually in the hole of a tree or of a wall—is not only partly composed of the foulest materials, but its condition becomes worse as incubation proceeds, for the hen scarcely ever leaves her eggs, being assiduously fed by the cock as she sits

Photo by Scholastic Photo. Co. [*Parson's Green*

HOOPOE

A relative of the Hornbill common in Europe

(a feature strongly recalling the custom of the Hornbills), and when the young are hatched their fæces are not removed by their parents, as is the case with most birds, but are discharged in the immediate neighbourhood of the nest, the unsanitary condition of which can readily be imagined. Worms, grubs, and insects generally, form the hoopoes' food, and upon it they get so fat in autumn that they are esteemed a delicate morsel in some of the countries of Southern Europe, and especially by the Christian population of Constantinople."

Beside the EUROPEAN HOOPOE, which also extends into Northern Africa, four other species are known, three of which are African, whilst a fourth ranges from India to Hainan.

Nearly related to the birds we have just described are the WOOD-HOOPOES. They differ from their allies in being crestless, having a more curved bill, and a plumage of metallic purple, with a white patch on the wings and white markings on the tail. Their habits resemble those of their more highly coloured relatives.

CHAPTER XIII

BEE-EATERS, MOTMOTS, TODIES, COLIES, AND TROGONS

IN the present chapter we deal with a number of birds of singular beauty and gracefulness. In their coloration green predominates, thus recalling the Rollers, Parrots, Plantain-eaters, and Kingfishers, all of which groups, as we have seen, contain a large proportion of green species.

The BEE-EATERS, like the Kingfishers, Hornbills, and Hoopoes, have a foot of quite peculiar structure, the middle and outer toes being joined together throughout the greater part of their length. They are an Old World group, ranging from the British Islands to Australia, in the American Continent their place being taken by the Motmots and Jacamars, of which we shall speak presently. They are especially plentiful in the African region, somewhat less so in the Indian, the temperate regions of the Old World possessing but few species.

On rare occasions one species visits the British Islands. This is, furthermore, one of the most beautiful of the group. It has the head, neck, upper back, and a broad wing-bar of a ruddy-brown colour; the lower back buff colour; green wings and tail, with black tips to the middle tail-feathers, which are longer than the rest. The forehead is pale green and white; the ear-coverts are black; and the throat bright yellow, divided from the greenish-blue underparts by a black band. "The name Bee-eater," writes Mr. Evans, "is well deserved, for in Spain [it] is a perfect pest to the bee-keeper, catching the workers as they enter and leave the hives." Like the Kingfishers, the indigestible parts of the food are cast up and deposited around the eggs, though bee-eaters do not appear to form a nest of them, as with the Kingfishers.

From four to six eggs of a beautiful glossy white colour are deposited in holes in banks, or — and this is worthy of special notice — in tunnels bored vertically downwards in level ground for a distance of from 3 to 10 feet. How this is done is a mystery, for the bird's beak and feet look by no means equal to such a task. No nest appears to be made, the eggs being deposited at the extremity of the burrow without further preparation. Two species of the group, however, are said to form an exception, constructing a nest of straw and feathers.

Photo by C. N. Mavroyem, Smyrna.

HOOPOE FLYING.

This photograph displays the crest fully elevated, and likewise shows the beautifully banded colouration of the under surface of the wing, as well as the position of the wings in flight.

These two, as well as the members of the genus to which the British bird belongs, apparently breed in colonies.

Unfortunately for the bee-eater, its flesh is palatable, whilst its plumage is in great demand for millinery purposes. Its persecution is of long standing, since more than 300 years ago Belon witnessed a particularly cruel experiment practised by the boys in Crete. Transfixing a beetle with a bent pin, to the head of which a thread was tied, and then holding its other end with their hand, they would let the insect fly. The bee-eater, which catches most of its prey on the wing, would dart upon it, and, swallowing the bait, be caught by the hook.

Photo by A. S. Rudland & Sons

BEE-EATER

A native of the Malay countries. The long feathers on the throat are bright scarlet

Not unlike the Bee-eaters in general appearance and coloration, the MOTMOTS are birds of peculiar interest, and this on account of a remarkable habit of one of their tribe — a habit which is perfectly unique, and to which we shall return presently. Belonging, as we have already remarked, to the New World, they range from Southern Mexico to Paraguay, inhabiting dense forests, and being but rarely seen. The plumage is somewhat loose in character — green, blue, cinnamon, and black in colour. The beak has the margins serrated, or saw-like; whilst the feet resemble those of the Kingfishers and Bee-eaters. As with the Bee-eaters, no nest is made. The eggs, three or four in number and creamy white in colour, are deposited in a hole bored by the birds themselves in a tree or bank, both sexes sharing in the work of incubation. Their food consists of insects caught in the air, small reptiles, and fruit.

The remarkable habit to which we have referred is displayed by the species known as the RACKET-TAILED MOTMOT, from the fact that the two middle tail-feathers project beyond the others, and have the greater part of the shaft bare, but terminating in a spoon-shaped expansion. In this there is nothing unusual, for such racket-feathers are common amongst birds. In this particular case, however, the feathers were originally entire, and acquired their characteristic shape artificially, the bird nibbling away the vane on either side of the shaft with its bill until the required shape is obtained. Such an act of conscious decoration on the part of a bird is elsewhere unknown throughout the whole class.

The TODIES are diminutive allies of the Motmots, frequenting hilly districts and woods. They sit with the beak pointed upwards, the head drawn in close to the body, and the plumage puffed out, apparently oblivious of all around them — at least it would seem so, since at such times they may be caught with a butterfly-net. Like their larger allies, they are green in coloration, but have a light red throat, and yellowish-white or pinkish under-parts, with green or pink flank-feathers. They vary in length from 3 to $4\frac{1}{2}$ inches.

Photo by A. S. Rudland & Sons

RACKET-TAILED MOTMOT

Note the mutilated tail-feathers

The COLIES, or MOUSE-BIRDS, of South Africa are small, crested, long-tailed, loose-plumaged birds whose exact relationships are somewhat puzzling. The name Mouse-bird is given on account of the habit of creeping along the boughs of trees with the whole foot applied to the branch. The toes are peculiar in that all turn forwards, and are commonly so retained. About ten species are known, ranging from Abyssinia southwards.

Resplendent without doubt are the majority of the forms which we have been lately considering, but probably the palm for gorgeous coloration should be given to the TROGONS — at least they must be allowed to share the honours with the Humming-birds.

The most splendid of all is the QUEZAL, the male of which has a train of great length, resembling at first sight a tail. But, as in the peacock, this is formed by enormously elongated tail-coverts, concealing the true tail. These tail-coverts differ, however, markedly from those in the peacock in that they are not erectile, but pendent. The head is ornamented with a large, rounded crest; the ground-colour of the upper parts of the plumage is of brilliant metallic green; the under parts from the chest downwards are of a deep blood-red. Certain of the covert-feathers of the wing form elegant drooping plumes, hanging down on either side and giving a wonderfully beautiful effect.

The late Mr. Salvin's account of this bird in its wild state is well worth quoting. Hunting with a native for this bird in the forest, where alone it is to be met with, he writes: "A distant clattering note indicates that the bird is on the wing. He settles — a splendid male — on a bough of a tree, not seventy yards from where we are hidden. Cipriano wants to creep up to within shot, but I keep him back, wishing to risk the chance of losing a specimen rather than miss such an opportunity of seeing the bird in its living state, and of watching its movements. It sits almost motionless on its perch, the body remaining in the same position, the head only moving from side to side. The tail is occasionally jerked open and closed again, and now and then slightly raised, causing the long tail-coverts to vibrate gracefully. I have not seen all. A ripe fruit catches the quezal's eye, and he darts from his perch, hovers for a moment, picks the berry, and returns to his former position. This is done with a degree of elegance that defies description."

CHAPTER XIV

TOUCANS, HONEY-GUIDES, JACAMARS, AND PUFF-BIRDS, BARBETS AND WOODPECKERS

GAUDY in plumage, and somewhat ungainly in appearance, it must nevertheless be admitted that the TOUCANS form an exceedingly interesting group of birds. On account of their huge and gaily coloured beaks, they have been imagined to be related to the Hornbills; but even judging by this character, the two groups may be readily distinguished; for whereas the typical beak of the hornbill is surmounted by a large casque, the beak of the toucan is

never so ornamented. The solid appearance of the beak in the toucan, by the way, is as much a fiction as with the hornbill, since the horny sheath is supported, not on a core of solid bone, but on a frame of delicate bony filigree-work, the spaces being filled by air. The coloration of the plumage (which is somewhat loose in character), as well as of the bare skin round the eye and the beak-sheath, is most brilliant, and displays immense variation amongst the different species.

Shy and restless in their habits, toucans travel generally in small flocks amongst the forest-trees and mangrove-swamps in search of food, which consists mainly of fruits and seeds, varying this diet occasionally with ants and caterpillars. It is to this diet of fruit that the great size of the bill and its peculiar saw-like edges are to be traced — at least this is the opinion of the great traveller-naturalist Bates, who had so many opportunities of watching these birds. "Flowers and fruit," he writes, "on the crowns of the large trees of South American forests grow principally towards the end of slender twigs, which will not bear any considerable weight. All animals, therefore, which feed principally upon fruit, or on insects contained in flowers, must, of course, have some means of reaching the ends of the stalks from a distance. Monkeys obtain their food by stretching forth their long arms, and in some instances their tails, to bring the fruit near to their mouths; humming-birds are endowed with highly perfected organs of flight, with corresponding muscular development, by which they are enabled to sustain themselves on the wing before blossoms whilst rifling them of their contents; [and the long bill of the toucan enables it] to reach and devour fruit whilst remaining seated, and thus to counterbalance the disadvantage which its heavy body and gluttonous appetite would otherwise give it in the competition with allied groups of birds."

Photo by A. S. Rudland & Sons

TROGON

Trogons haunt the recesses of the thickest forests

Toucans appear to be much esteemed as articles of food — at least during the months of June and July, when these birds get very fat, the flesh being exceedingly sweet and tender. They nest in holes of trees at a great height from the ground, and lay white eggs.

One of the most remarkable of the group is the CURL-CRESTED TOUCAN, from the fact that the feathers on the crown of the head are peculiarly modified to form scroll-like, glossy curls, which have been compared to shavings of steel or ebony. Mr. Bates writes: "I had an amusing adventure one day with one of these birds. I had shot one from a rather high tree in a dark glen in the forest, and entered the thicket where the bird had fallen to secure my booty. It was only wounded, and on my attempting to seize it set up a loud scream. In an instant, as if by magic, the shady nook seemed alive with these birds, although there was certainly none visible when I entered the jungle. They descended towards me, hopping from bough to bough, some of them swinging on the loops and cables of woody lianas, and all croaking and fluttering their wings like so many furies. If I had had a long stick in my hand, I could have knocked several of them over. After killing the wounded one, I began to prepare for obtaining more specimens and punishing the viragos for their boldness. But the screaming of their companion having ceased, they remounted the trees, and before I could reload every one of them had disappeared."

With neither charm of colour nor peculiar shape, the small African birds known as HONEY-GUIDES are some of the most remarkable of birds, and this on account of a quite

unique habit of inducing other animals, not even excepting man, to hunt for them. Sir John Kirk, writing of its habits in the Zambesi district, says: "The honey-guide is found in forests and often far from water, even during the dry season. On observing a man, it comes fluttering from branch to branch in the neighbouring trees, calling attention. If this be responded to — as the natives do by whistling and starting to their feet — the bird will go in a certain direction, and remain at a little distance, hopping from one tree to another. On being followed, it goes further; and so it will guide the way to a nest of bees. When this is reached, it flies about, but no longer guides; and then some knowledge is required to discover the nest, even when pointed out to within a few trees. I have known this bird, if the man, after taking up the direction for a little, then turns away, come back and offer to point out another nest in a different part. But if it does not know of two nests, it will remain behind. The difficulty is that the bird will point to tame bees in a bark hive as readily as to those in the forest. This is natural, as the bee is the same, the bark hive . . . being simply fastened up in a tree, and left for the bees to come to. . . . The object the bird has in view is clearly the young bees. It will guide to nests having no honey, and seems equally delighted if the comb containing the grubs is torn out, when it is seen pecking at it."

Photo by A. S. Rudland & Sons

CURL-CRESTED TOUCAN

So called from the curiously curled feathers on the head, resembling black and glistening shavings

An old rumour had it that honey-guides occasionally lured men on to spots where lions or other large and dangerous beasts lay hid. No credence whatever is now given to such tales, it being readily understood that the bird's course may by accident pass directly above perils of this kind, without the slightest cognisance of this on the part of the bird.

The honey-guide, however, presses into its service one of the lower mammals — the ratel. The fondness of this animal for bees is well known, and by none better than this little bird, which, by pointing out nests to its more powerful companion, earns as a reward the broken bits which remain after the feast.

Allies of the sombre-coloured Honey-guides are the JACAMARS and PUFF-BIRDS. The former are rather handsome birds, though small, having the upper-parts of a metallic coppery golden green, and more or less rufous below. Ranging from Mexico to South Brazil, they may usually be found on the outskirts of forests, near water, sitting perched on the bare boughs of lofty trees for hours at a time. They feed on moths and other insects, caught on the wing, and brought back and crushed against the bough before swallowing. They lay white eggs in the holes of trees.

The PUFF-BIRDS, though closely allied to the foregoing, are more soberly clad. Black, brown, and rufous in hue, they lack the resplendent metallic markings of the Jacamars. Their geographical range extends from Guatemala and Honduras to Argentina. Though numerous species and genera are known, the nest and eggs appear to have been discovered in the case of one species only: these were found in a hole in a bank, and contained two shining white eggs.

The BARBETS are possibly more closely related to the Honey-guides than the Jacamars and Puff-birds. Brilliantly coloured, and having a plumage exhibiting violent contrasts of red, blue, purple, and yellow, on a green ground, sometimes with crests, bare skin round the eye, and brightly coloured bills, the barbets are, in spite of a somewhat hairy appearance, exceedingly attractive birds.

Forest-dwellers, like their allies, they feed upon fruit, seeds, insects, bark, and buds; but so noiseless are they said to be when feeding that their presence is betrayed only by the falling of berries they have accidentally released.

It is interesting to note that the geographical range of the barbet is much wider than that of its immediate allies, extending through tropical Asia, Africa, and America.

The Woodpecker Tribe constitutes a large group, generally divided into two sections — the WOODPECKERS and the WRYNECKS.

The former are characterised by their large heads and very powerful bills and long and exceedingly stiff tails. The feet are also peculiar, two toes pointing directly forwards and two backwards. Beak, feet, and tail are all specially adapted to the peculiar habits of these birds, which pass their lives upon trees, climbing the trunks, and searching the interstices of the bark for ants, or drilling holes into the unsound portions of the trunk itself for the purpose of extracting the grubs which feed upon decaying wood.

Photo by A. S. Rudland & Sons

HONEY-GUIDE

The name is bestowed on account of its remarkable habit of drawing attention to bees' nests

Photo by A. S. Rudland & Sons

A FAMILY OF GREATER SPOTTED WOODPECKERS

This woodpecker is a British species

That ants and other small insects form the staple diet of the woodpecker is evident from the extraordinary length of the tongue. This is a long, worm-like structure, capable of being protruded many inches from the beak, and covered with a sticky secretion, so that, thrust into colonies of ants, it quickly becomes covered with them, to be withdrawn immediately into the mouth and cleared again for further action.

Woodpeckers are all birds of bright plumage, some particularly so, and have a wide geographical distribution, inhabiting all parts of the world save Madagascar, the Australasian region, and Egypt.

Three species occur in the British Islands, though they are exceedingly rare in Scotland and Ireland. The GREEN WOODPECKER is a particularly handsome bird. Grass-green is the predominating colour of its livery, relieved by a light scarlet cap, a golden patch over the lower part of the back, and chequered bars on the wings and quills.

Photo by W. F. Piggott] *[Leighton Buzzard*

LESSER SPOTTED WOODPECKERS

One of the members of the group is using its stiff tail feathers as a support

Scarcely less beautiful, in their way, are the GREATER and LESSER SPOTTED WOODPECKERS. The plumage of these birds has a very rich effect, steely blue-black and white being contrasted with scarlet.

The SPOTTED and BLACK WOODPECKERS are remarkable for a curious drumming sound, so powerful as to be distinctly audible even a mile off. It appears to be caused by hammering vigorously on the bark of some rotten branch, the bird's head moving with amazing rapidity as it beats out this curious tattoo.

Three North American species, known as SAP-SUCKERS, have the curious habit of piercing the boles of trees for the purpose of procuring the sap which flows copiously when the tree is so "tapped." Another species of the same region seems to be possessed of a persistent dread of famine, storing up immense quantities of nuts, which it appears never afterwards to use. These nuts are tightly fixed into holes in the bark of trees, and in such numbers that "a large pine 40 or 50 feet high will present the appearance of being closely studded with brass nails, the heads only being visible."

The WRYNECKS differ from the Woodpeckers mainly in that the tail-feathers are soft instead of spiny. Although sombre, the plumage is yet very beautiful, having a velvety appearance, variegated with pearl-grey, powdered or dusted over a general groundwork of nut-brown, buff, and grey. Bars and fine lines add still more to the general effect, and render description still more difficult. One species is common in England. It is known also as the CUCKOO'S MATE and the SNAKE-BIRD. The former name is given in allusion to the fact that it arrives with the cuckoo, the latter from its strange habit of writhing its head and neck, and also on account of its curious hissing note, made when disturbed on its nest. It has the long, worm-like tongue of the woodpecker, but without a barbed tip.

The habit of writhing the head and neck often serves the wryneck in good stead. Nesting in a hole in a tree, escape is difficult so soon as the discoverer has come to close quarters. The untried egg-collector, for instance, peering down into the nest, and seeing nothing distinctly, but only a moving head, and hearing a hissing sound, imagines the hole to be tenanted by a snake, and beats a hasty retreat, only to catch a glimpse, a moment later, of the bird hurrying out of its perilous hiding-place. Should he, however, discovering the true state of affairs, put down his hand and seize the bird, it will adopt yet other resources. Clinging tightly to its captor's finger, it will ruffle up its feathers, stretch out its neck, and at the same time move it jerkily and stiffly about, and finally, closing its eyes, hang downwards, as if dead. Then, before the puzzled captor has had time to realise what has happened, it loosens its hold and takes instant flight.

The young are easily, though rarely, tamed, and form extremely interesting pets, feeding readily from the hand, and affording endless amusement by their remarkable manner of capturing flies and other insects; but they do not appear to live long in confinement.

The wryneck is one of the few birds which will persistently go on laying eggs, no matter how many times they may be stolen from the nest. A case is on record where as many as forty-two were laid in a single summer by one bird—an exceedingly cruel experiment.